DOCUMENT RESUME

ED 054 806 LI 003 082

TITLE Information Requirements of Researchers in the Social Sciences. Volume 1: Text.

INSTITUTION Bath Univ. of Technology (England). Univ. Library.

PUB DATE May 71

NOTE 280p.;(56 References); Investigation into Information Requirements of the Social Sciences, Research Report 1

EDRS PRICE MF-$0.65 HC-$9.87

DESCRIPTORS *Foreign Countries; *Information Needs; Information Systems; Information Utilization; *Researchers; *Social Sciences; *Teachers; Universities; Use Studies

IDENTIFIERS *England

ABSTRACT

The main findings of an investigation into the information requirements of the Social Sciences, conducted between September 1967 and December 1970, are reported. It covers the information needs of social science researchers, and of teachers in social science departments of universities. The objective of the investigation was to provide material useful for the design of information systems. Data were collected not only on current information gathering practices and information uses but also on more fundamental issues relating to the nature of the work being carried out and the type of information required for it. Three methods of investigation were used: (1) a questionnaire circulated to a national sample drawn from a population of all the social science researchers that could be identified, (2) interviews and (3) day-to-day observation of a very small number of social scientists. A review of relevant literature and work already conducted was an essential ingrediant of this investigation. (Volume II of this report which contains the tables of the study is available as LI 003083) (Author/NH)

ED054806

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

Bath University Library

Investigation into Information Requirements of the Social Sciences

Research Report no. 1

INFORMATION REQUIREMENTS OF RESEARCHERS IN THE SOCIAL SCIENCES

Volume 1: Text

Project Head: Maurice B. Line
Senior Research Fellow: J. Michael Brittain
Research Fellow: Frank A. Cranmer

LI 003 082

May 1971

Contents

1.0 INTRODUCTION

1.1 Background 1
1.2 Coverage 6

2.0 METHODOLOGY 7

2.1 Information needs, uses, and demands 7
2.2 Decision about method 8
2.3 The use of interviews 11
2.4 Construction of questionnaire 13
2.5 Identification of groups of social science users 13
2.6 Sampling 15
2.7 Response 20
2.8 Interviews of non-respondents to questionnaire 22
2.9 Coding of questionnaires 23
2.10 Statistical analysis 25
2.11 Principal variables used in the analysis 26

3.0 RESULTS AND DISCUSSION 31

3.1 Demographic variables and characteristics of population 32
3.1.1 Age distribution of respondents 32
3.1.2 Qualifications of respondents 32
3.1.3 Status, research experience, and subject of research 33
3.1.4 Environmental differences 34
3.1.5 Details about research activities 37

3.2 Information requirements for research 39

3.2.1 Structure of questionnaire and emphasis on formal channels of communication 39
3.2.2 The raw materials of research 41
3.2.3 Different types of information and their use 42
3.2.4 Different types of information and their judged importance 48
3.2.5 The use of physical forms 53
3.2.6 Methods of locating references for research 62
3.2.7 Use of personal files 78
3.2.8 Use of photocopies 79
3.2.9 Use of bibliographical tools 80
3.2.10 Use of, and requirements for, monographs 92
3.2.11 Use of libraries 96
3.2.12 Requirements for older published materials 105
3.2.13 Keeping abreast of new publications 108
3.2.14 Keeping track of current research in progress 118
3.2.15 Capability in foreign languages 129
3.2.16 Foreign language material: scanning the literature 131

3.2.17 Effect of language considerations on choice of research topic and conduct of research 136
3.2.18 Stimulus for ideas 142
3.2.19 Delegation of searching for references and willingness to use an information officer 144
3.2.20 Instances of late detection of information 152
3.2.21 Accidental discovery of information relevant to research 156
3.2.22 Special information problems 159

3. 3 Informal communications 164

3.3. 1 Discussion with colleagues 165
3.3. 2 Attendance at conferences 169
3.3. 3 Informal communications: conclusions 174

3. 4 Information requirements in teaching 174

3.4. 1 Nature of sample 175
3.4. 2 Research interests and subject taught 176
3.4. 3 Teaching load 177
3.4. 4 Usefulness of physical forms 177
3.4. 5 Methods of finding published information 180
3.4. 6 Adequacy of the local book stock 183
3.4. 7 Accidental discovery of material 184
3.4. 8 Keeping track of developments in broad subject areas for teaching 185
3.4. 9 Conclusions 186

3. 5 Publications, productivity, and information 186

3.5. 1 Information input and output 186
3.5. 2 Productivity 191

4.0 OVERVIEW 193

4. 1 Objectives of investigation 193
4. 2 Method of enquiry 195
4. 3 Summary of major findings 196

4.3. 1 General comments on information problems 198
4.3. 2 Information demands, uses, and needs 200
4.3. 3 Extent of social sciences: boundaries within social science, and classification of users 203
4.3. 4 Demographic and environmental variables 206
4.3. 5 Types of information use 207
4.3. 6 Informal channels of communication 209
4.3. 7 Use of bibliographical tools 211
4.3. 8 Use of libraries 214
4.3. 9 Methods of locating references for research 215
4.3.10 Keeping up with current publications 217
4.3.11 Keeping track of current research in progress 218
4.3.12 Delegation of searching 218
4.3.13 Late detection of information 220
4.3.14 The use of foreign language material 221
4.3.15 Special information problems 222
4.3.16 Teaching needs 223

4. 4 Questions/problems for further study 223
4. 5 Changes in emphasis 226

4. 6 Comparison of results of INFROSS with other studies of social science information 228
4. 7 Future directions 233

REFERENCES 235

APPENDICES

A Questionnaire
B Interview schedule for researchers
C Letter accompanying questionnaire
D First follow-up letter
E The capabilities of MVC
F The use of rating-scales

Foreword

This is a report on the main findings of the Investigation into Information Requirements of the Social Sciences, conducted between September 1967 and December 1970, first at the University of Newcastle upon Tyne, then at the University of Bath. It covers the information needs of social science researchers, and of teachers in social science departments of universities. Information needs of social scientists in government departments, of colleges of education lecturers and schoolteachers, and of social workers, are reported respectively in Research Reports numbers 2, 3 and 4.

During the first part of the Investigation, at the University of Newcastle upon Tyne (September 1967 to March 1968) the Senior Research Fellow was Mr. K.H. Reese Edwards. Mr. J. Michael Brittain succeeded him as Senior Research Fellow in October 1968. Mr. Frank Cranmer was Research Fellow from October 1967 to October 1970.

I was mainly responsible for the design of the questionnaire (Appendix A), although Mr. Reese Edwards and Mr. Cranmer helped with it, and it was subjected to three external experts in survey design. Coding of questionnaires was the responsibility of Mr. Cranmer, but much of the coding was done by Mrs. Joyce Line, and some questionnaires (relating to education) were coded by Miss V.A. Winn, researcher on the Sociology of Education Abstracts project. I initially laid down the requirements for analysis and tabulation of questionnaire data, and Mr. Brittain and Mr. Cranmer both reviewed these; detailed specification was done by Mr. Cranmer, with technical help and advice from Bath University Computer Unit.

Preliminary interviews were conducted by Mr. Reese Edwards, Mr. Cranmer and myself. The main interviews were conducted by Mr. Brittain and Mr. Cranmer (although I took part in several of the interviews with practitioners).

The interpretation of all data, and the writing of the report, were undertaken by Mr. Brittain. However, it was read, commented on, supplemented and revised by Mr. Cranmer, Mrs. Dawn Cunningham, and

Miss Susan Evans (the two researchers on the OSTI-supported Experimental Information Service in the Social Sciences), Mr. Stephen A. Roberts and Miss Barbara Skelton (researchers appointed to the project which has followed INFROSS - Design of Information Systems in the Social Sciences), and myself.

The report itself draws attention to the more striking findings, but in order to keep the report within bounds no attempt has been made to point out all results which may be of interest. Similarly, little attempt has been made at extensive interpretation; the data have in general been left to speak for themselves, for readers and researchers to explore and interpret according to their own interests and expertise.

The tables printed with this Report are a selection from the 600-odd produced by the computer. They are a generous selection, but if additional data, not given here, are wanted by other researchers in the field, it may be possible to provide them.

This report is not the end of the involvement of Mr. Brittain, myself, and our new researchers with INFROSS and its findings. Work on a comparison of the findings with those of user studies in sciences is already under way, and the results relating to the foreign languages and the problems they cause are being compared with those of the Sheffield University study on the language barrier. Mr. Brittain and myself hope to write the material from INFROSS (including that contained in Research Reports nos.2, 3 and 4) into the form of a book, with a good deal more commentary and intepretation and with the data presented in the form of diagrams and a much smaller selection of tables.

Finally, a word of caution about INFROSS and the Reports resulting from it. A great deal of interest has been aroused by the Investigation, largely because it was exploring almost unknown territory, and because of its scale. It was however an exploration, not in any sense an attempt to reach final conclusions about information requirements, let alone to find answers to the problems of social science information services. Considering that numerous user studies in science have not yet succeeded in either of these aims, it would be unreasonable to expect a study in the social sciences, on whatever scale, to do so. We do however believe we have shed light on many areas, and helped to

indicate directions in other areas in which progress is likely to be made.

Acknowledgments

During the course of the Investigation help has been given at various stages by researchers working on related projects, and by individuals on the staff of OSTI, notably Mr. Alan Macgregor. The SRC Atlas Computer staff at Chilton were very patient with our requests for large numbers of analyses of large quantities of data. Our clerical assistant, Mrs. Monida Harris, stayed with us throughout the whole period at Bath, and although additional assistance was needed at various stages, she bore the brunt of the typing, including the tabulations. I would like to thank all of these; but most of all I wish to thank those who made the Investigation possible by agreeing to be interviewed, and, particularly, those who spent an hour or two over a long and complex questionnaire.

Maurice B. Line

Project Head
May 1971

Chapter 1

INTRODUCTION

1.1 Background

Although the study of the information requirements of scientists and technologists has a history of about twenty-five years - going back to the papers presented by Bernal and others at the 1948 Royal Society's Conference on "Scientific information" - as recently as 1965 Paisley concluded that there were no user studies in the social sciences. It was in the light of this gap in the knowledge about social science information that a proposal for the present Investigation was put forward to the Office for Scientific and Technical Information (OSTI) in 1967.

The preliminary stage of the Investigation lasted from October 1967 until March 1968. During this period the researchers examined relevant and related research already carried out and in progress, designed the main part of the study, and drew samples. The results of the preliminary stage were given in a report submitted to OSTI in April 1968 (Bath University of Technology, 1968). This report outlined the other major information studies in the social sciences that had been completed or were under way, concentrating especially upon United Kingdom work; gave theoretical backing to the Investigation, including a conceptual analysis of the problem; and pointed to the assumptions made in such investigations, the types of information needed in research and teaching, the problems associated with the classification of users, the personality characteristics of users, and possible solutions to information problems in the social sciences. The report went on to consider the difficult problem of information needs, as opposed to information demands or information uses. The third chapter outlined the methodology of the Investigation, necessarily drawing heavily upon existing user studies in science and technology. The report gave special attention to the three methods to be used in the Investigation: questionnaire, interview, and direct observation.

During the preliminary stages of the Investigation, 85 interviews with social scientists were held. These were undertaken to: (a) identify the problems and to clarify the research team's thinking about them; (b) design and test questions for eventual use in a mail questionnaire; and (c) provide some data from which provisional conclusions could be drawn.

The initial task was clearly the identification of the major areas requiring exploration. It was concluded that there were at least nine categories of user cutting across research, teaching and practice, which should be covered in a general investigation of information requirements of the social sciences. These groups were: researchers in (a) universities and other institutions of higher education; (b) government departments; (c) research institutes: teachers in (a) universities; (b) other institutions of higher education; (c) schools: and practitioners in (a) industry; (b) social work; (c) government.

In an article based upon the Preliminary Report, Line (1969) considered the special problems that faced enquiries into the information requirements of the social sciences. These include the nature of social science material, the 'soft' terminology of the social sciences, and the relatively recent empirical approach in most social science disciplines. Also, factors relating to the financing and national support of the social sciences, and the application of the results of basic research were seen to be very different in the social sciences when compared with the sciences. It can be argued that the special characteristics of the social sciences make a straightforward application of the methods of user studies in science and technology to the social sciences, difficult, and sometimes impossible. A complementary paper by Line (1968) also dealt with the special problems associated with information needs and requirements in the social sciences.

From the beginning, the objective of the Investigation was to establish data which could be used in information systems design in the social sciences. This was made clear by Line (1969) who pointed to the necessity of including, in an effective system, psychological, sociological, and economic criteria. It was pointed out that research into information needs has been less effective than could have been hoped, perhaps because it has been approached too much as a technical problem and without

attention being paid to users. In order to obtain data on a number of other (i.e. non-technical) aspects of information requirements the Investigation used a combination of three methods.

The choice of methods was dictated largely by the desire to obtain data in depth about users, to provide a measure of validity of the data, and to allow testing of a limited number of information services in practice. To obtain data on a large scale required the use of a mail questionnaire; to provide a check on the validity of the data obtained from the questionnaire necessitated the use of interviews, which could be used on a much smaller sample; and to provide an opportunity for the testing of information services and tools required the participant observations of the Experimental Information Officer. The general pattern of information requirements was established by use of the questionnaire, and more detail was obtained from semi-structured interviews, where the opportunity was taken to enquire into the nature of the research being conducted and to pose certain hypothetical questions to interviewees. Data about day-to-day information habits and requirements of individuals were gathered by the Experimental Information Officer, supported for a period of two years* by OSTI. The number of researchers observed and served by the Information Officer was relatively small, but they were intensively studied over a continuous period. All three methods were used in the Investigation, and this enabled a much clearer picture to be drawn of information requirements of the social sciences.

In the absence of any full-scale survey of social science information problems, INFROSS was designed to provide an aerial view of the social sciences, to see how far existing information systems and services met the empirically determined requirements, and to make a preliminary formulation of the design requirements which future information systems should satisfy. It must be emphasized that the Investigation did not set out to design an information system in the social sciences, nor indeed to provide the material necessary to make modifications to existing systems and services. To do this involves the identification and costing of individual items in an information system (for example, journals, frequency of use, cost of abstracting services).

---

* Later extended to a third year.

The details of the methodology and the sampling are given in the following chapter; but it must be pointed out here that in order to cover the whole range of social scientists at a national level, the present Investigation was designed to interlock closely with the results of other user studies in particular areas. A national survey, as INFROSS set out to be, must cover a very wide range of researchers, teachers and practitioners. Not all groups of users identified could be covered, because of limitations of staff and finance. If some groups of users had to be omitted from the sample at the expense of others, then it appeared fairly obvious that researchers had to be included. This was in fact the course of action. It was not assumed that the information requirements of university-based researchers were more important than those of practitioners, but it was assumed (and the evidence bore this out) that they were much more complex. From the point of view of the main body of social science knowledge it is obvious that the producers of knowledge (at least in conventional print form of serial articles and monographs) are researchers and theoreticians, and that a good deal of the information that flows to practitioners and teachers is that produced by the researchers. Thus, the researchers had to be given special attention in the Investigation - the first of its kind in the social sciences.

A large sample of researchers was drawn and questionnaires circulated. A much smaller sample of researchers was interviewed to obtain further data and give depth to the study. It is the results of the questionnaire survey, with, where appropriate, additional material from interviews of researchers, that constitutes the bulk of this report. Other aspects of the Investigation are reported in more detail in Research Report number 2, which deals with the information requirements of social scientists employed in government departments, Research Report number 3, which deals with college of education lecturers and school-teachers, and Research Report number 4, which is concerned with social workers.

At the time the Investigation began in 1967 there was very little completed research into information problems in the social sciences. However, one or two research projects were in progress at the time, and during the last three years one or two other projects have got

under way. INFROSS has attempted to get to know about all related projects, and to maintain close contact with all those in the United Kingdom, partly because they have been potential producers of data likely to be complementary to the INFROSS data, and partly because the objective of INFROSS (to produce data for systems design) is shared by many other projects. In fact, in the Report on the Preliminary Stage, six pieces of research into social science information were specifically mentioned as potentially contributing, in the long term, to the results of INFROSS, and subsequently to the design of information systems. Some of these projects have now been completed. Dews and Ford (1969) have dealt with the information needs in teaching business studies and the documentation services at present available; White (1970) completed an investigation into information problems in town and country planning; and a study by Barker and Rush (1970) of the information requirements of MPs has been published. OSTI has also supported a research project into Sociology of Education Abstracts, with particular reference to the development of an indexing system for this service. Details of this project have been reported by Winn (1969a, 1969b, 1971) and Swift and Winn (1970).

The final stage of INFROSS was impeded to a certain extent by the absence of good and reliable data about the characteristics of the existing social science literature and information tools. At the time the Investigation began in the Autumn of 1967 it was hoped that an analysis of the characteristics of existing social science information sources and tools would be available. However, this has not been forthcoming, and as a result the last stage of INFROSS was considerably disrupted. As thinking about information systems design in the social sciences has progressed it has become clear that a detailed analysis of the statistical structure of the social science literature is required (such analyses are conveniently called bibliometric studies). A preliminary outline of the possibilities of this type of approach has been made by Brittain (1970, especially chapter 4). In fact, the third and final stage of INFROSS has now been expanded a great deal and has been incorporated into the first stages of a new project supported by OSTI at Bath University, which is to conduct research required for the design of information systems in the social sciences.

A review of relevant literature and work already conducted was obviously an essential ingredient of the Investigation. A sizable offshoot of the Investigation started life as a review of the literature on previous work dealing with information requirements of the social scientist, but was expanded and published as a monograph (Brittain, 1970) to include sections dealing with methodological issues of user studies, terminological problems, and special problems involved in the study of information requirements of the social sciences, as well as a comprehensive review of existing studies of information requirements in the social sciences and a chapter on bibliometric studies in the social sciences.

1.2 Coverage

An agreed definition of 'social sciences' does not exist. At its narrowest, the term may be confined to sociology, politics, economics and anthropology; at its broadest, it may include history and law. The social sciences were defined for the purposes of this Investigation as anthropology, economics, education, politics, psychology and sociology. Education was included as the relationships between educational research and practice and other disciplines, especially psychology and sociology, appeared to be particularly close and important. Law was excluded as a field with a large number of special information characteristics and problems.

Social scientists were held to include all persons concerned with the social sciences as a main area of work, whether the work consisted of research, teaching, administration or practice. Thus, academic theoreticians and social workers were all considered to be within the purview of the Investigation. The extent to which those falling within this very broad definition were actually studied is considered in 2.5.

Chapter 2

METHODOLOGY

2.1 Information needs, uses, and demands

In the field of information there is a good deal of controversy surrounding the various possibilities of enquiry. The distinction between information needs, demands made upon the system, and the uses actually made of information, is not always clearly drawn: indeed the distinction is very difficult to make. However, it is an important distinction to make because the method of enquiry is dependent to a large extent upon the objectives. The difference between information needs, demands, and uses has been discussed by Line (1969). Only a brief summary of the problem is given here. It is relatively easy to give a satisfactory and operational definition of demands made upon a system or source, and of uses made of a source or a service which is available or provided. Most user studies which have purported to be of information needs have in fact been of information uses or demands. Even so, fine distinctions between, for example, intended use (arising from a positive demand) and unintended use (made, e.g. in the course of browsing) have not been made. Although much information seen as relevant is gathered by users, there must also be a great deal of relevant information that is not gathered at all, or sought in any sense. Some of this is likely to be of importance although its importance may be of quite a different kind from that of "sought" information: the latter being central to the activity, the former shedding new light, offering fruitful analogies, extending a conceptual framework; or suggesting possible lines of development. It may also act as a stimulant.

Information need can be expressed in the question "What information would further this job or this research, and would be recognised as such by the recipient?" Thus, in order to hypothesize profitably about information needs, it is necessary to explore in some depth the nature of the task which creates the information needs: that is, to study what is involved in the job, research, or other activity. This can be done in general terms, by seeking answers to the question "What are you research-

ing into?" or "What does your job involve?" and also in more particular terms by examining over shorter or longer periods the actual processes involved in the job.

Studies of use and demand are quite inadequate as bases for the design of information systems, the more so as they have little predictive value. They can help in the design of an information system which will do better what is done already, but not one which will do better things. Any study of need must clearly include data about use and demand although further enquiries are necessary to supplement this data, and to hypothesize about need from the nature of the activities in which individuals are involved. Although this approach is less reliable than the other it is probably more valid. The two types of approach together should enable a more accurate assessment of need to be made than before. It is on these lines that the Investigation was designed, and decisions made about the methods to be used.

Obviously, the more conventional aspects of information requirements, that is demands and uses, can be ascertained either by asking the user in the interview situation or by relatively simple questions in a questionnaire.

2.2 Decision about method

For a number of reasons given below, it was decided to use a questionnaire (see Appendix A) for the main body of the Investigation. The use of a very long mail questionnaire as the main means of collecting data needs explanation. The deficiencies of questionnaires for such purposes are well known, and when they are used the golden rule is to keep them as short as possible. The circumstances in which the Investigation took place should however be recalled.

In the first place, very little indeed was known about the information uses, let alone needs, of social scientists, in this country or elsewhere. There was therefore no indication whatever at the time of the overall pattern of use and need in the social sciences, nor was there evidence to suggest what aspects or disciplines might most profitably be studied in detail. This made a large sample, with a wide coverage, desirable if not imperative.

Secondly, because there had been little previous investigation, there was no means of knowing what questions might or might not bring forth useful information. In the event, some of the questions in the INFROSS questionnaire could well have been omitted - but this could not be known until the questions had been tried. One of the deficiencies of science information studies has been the limited range of questions asked, and it seemed unwise to restrict the questionnaire to obvious and simple questions which would have revealed very little of value.

Finally, it was recognised by OSTI as well as ourselves that there was some urgency in the Investigation: social science information systems, hitherto largely undeveloped, showed signs of rapid growth, and it was important to find out fairly quickly in what directions growth should take place if the chaotic proliferation of science information systems was to be avoided. This urgency, and the limited time and money available, made extensive piloting impossible.

One alternative would have been to investigate particular aspects or disciplines one after another. This however would have involved a whole series of questionnaires, which would hardly have been more acceptable than one long one; and as they would have been applied at different times, many useful cross-analyses would have been impossible, since the circumstances in which the questionnaire was answered would have changed.

In fact, all the sections of the questionnaire dealt with aspects on which knowledge was definitely needed. In retrospect, while it is possible to identify questions which could easily have been omitted, it is very hard to see which sections could have been left out without the loss of useful information.

As with all mail questionnaires, some defects became apparent after the event. With all the questionnaire's faults, however, avoidable or unavoidable, it is difficult to see what alternative there was, given the particular circumstances.

Interviews, as well as being used in the pilot stages to help in the construction of a questionnaire, were used to provide supplementary data to the questionnaire, to follow through in more detail some questions on

which the questionnaires were likely to yield superficial data, and to enquire about aspects that could not properly be studied in the questionnaire. An example of the check list used in interviews is given in Appendix B. There are subtle aspects which cannot be explored except by face-to-face interviews. The interview method was used to follow up selected respondents to the questionnaire, to provide some check on validity; to approach individuals chosen on a random basis from those not circulated with the questionnaire; and to follow up a selection of those who did not respond to the questionnaire, with a view to seeing what sort of bias non-response might have caused. Interviews were also conducted with social scientists in government departments and with social science practitioners, but the details of these interviews are given in Research Reports numbers 2, 3 and 4. A number of social scientists working in government departments were included in the sampling frame.

Other methods were considered, such as asking researchers to keep a diary of day-to-day information events, and also a new type of questionnaire, devised on similar lines to personality tests, where validity and reliability measures are first taken, was considered; but in the context of this Investigation these methods were not practical.

Questionnaires and interviews together, dependent as they both are on the respondents' memories and impressions, could not be expected to provide data of high validity on the actual habits and needs of users. To supplement the more general mass of data, therefore, data based on day-to-day observation was required. An obvious way of obtaining this was to put an investigator into an environment where users were operating. A grant was sought and obtained from OSTI for an experimental information service in the social sciences, serving researchers and teachers at Bath and Bristol Universities. This project, starting in January 1969, provided an opportunity of testing out a personalized information service in an academic environment, and of providing some day-to-day observations of social science researchers. A "visible" observer is bound to effect the information habits of users, whether by merely making them more conscious of these habits, by providing information which they might not otherwise have sought, or even by breaking down resistances to information gathering. Some of these effects can be put to use, by making it possible to study the reactions of users to personalized information services,

but the variations of personal interaction are so numerous that a large number of such experiments would be necessary to provide reliable results. The personal interactions associated with close proximity can be somewhat reduced by establishing an information officer as part of a library service: this in fact was what was done. The Information Officer was in a position to observe users fairly unobtrusively, and to attempt an evaluation of the effect of information services. Reports on the first and second years of operation of the service have been presented to OSTI (Bath University of Technology, 1970 and 1971). The material from the questionnaire and the interviews is in many ways quite capable of standing by itself, and it is obvious that the uncontrolled observations of one or two information officers are not enough to make generalizations possible. However, it has proved extremely valuable to have such observations available when interpreting the data from a large number of questionnaires. In the majority of cases the observations from the Information Officers have not modified to any large extent the findings of the survey, but in a number of instances they have proved useful in confirming the picture established from the questionnaire data. The existence of an Experimental Information Service, working in conjunction with a more controlled and statistical survey, has of course provided a useful check on the validity of some of the more difficult types of problems with which the questionnaire method is not particularly suited to deal.

2.3 The use of interviews

In the first stage of the Investigation interviews were used to (a) explore the territory and obtain ideas; (b) explore the sort of questions that bring responses; (c) test questions to be used in the questionnaire; and (d) draw preliminary conclusions to be followed up further.

Details of the preliminary interviews are given in the Report on the Preliminary Stage (Bath University of Technology, 1968). The initial task was to identify the major areas requiring exploration. Interviews were almost totally unstructured and where possible people were interviewed in small groups. During the preliminary stage a large collection of possible questions was amassed, derived partly from the interviews and partly from previous user studies. These questions were gradually

reduced in number, refined, and occasionally supplemented until it became possible to construct a draft interview guide which in turn provided the skeleton for the mail questionnaire eventually used. Altogether 85 such interviews were undertaken. The use of interviews in the main Investigation was quite different; this is explained below.

For the reasons already given, the main research instrument was a mail questionnaire (see Appendix A), but during the Investigation interviews were conducted with a selected sample of social scientists. Data from interviews supplemented the data from questionnaires by: (a) asking questions which could not be asked in a questionnaire; (b) obtaining off-the-cuff information volunteered by respondents; (c) checking answers to similar questions asked in the questionnaire; (d) following up aspects shown by the questionnaire survey to be of interest, but not suspected beforehand; (e) following up aspects explored by the questionnaire to which answers were generally inadequate or ambiguous. The sample of social scientists was divided roughly, so that 95 per cent received a mail questionnaire and 5 per cent were interviewed, and a further 5 per cent of the questionnaire respondents were subsequently interviewed. A further small sample of non-respondents were also interviewed. The main timetable of the empirical investigation was thus:

Exploratory interviews	October 1967 - March 1968
Mail questionnaire	May 1968 - November 1968
Interviews with researchers not receiving mail questionnaire	April 1968 - November 1968
Interviews with researchers receiving mail questionnaire	November 1968 - April 1969
Interviews with non-respondents to mail questionnaire	November 1968 - April 1969
Exploratory interviews with practitioners and other groups of social scientists not receiving questionnaire	October 1967 - December 1968
Interviews with practitioners and other groups not receiving mail questionnaire	January 1969 - April 1969

2.4 Construction of questionnaire

Exploratory interviews with users, and a study of past user studies, were undertaken before the first draft questionnaire was constructed and used in a pilot study on a small number of users. A revised questionnaire was circulated to a pilot sample and this was much modified from the original attempt. Following the results of the pilot study (these are reported in detail in the Report on the Preliminary Stage), the final version was constructed and printed. Questions about the individual were followed by questions about his research procedures. The raw materials of research, and the sources which were used to obtain information on them, were next examined. The actual use made of information systems, and the difficulties encountered in obtaining information, were then considered. In the final version of the questionnaire a shorter section was added on information requirements arising from teaching. As far as possible pre-categorized questions were used, but a substantial number of open questions proved necessary. Explanation for, and justification of, the questions included are given in Section 2.9.

One very serious disadvantage of the questionnaire as designed was its length. It could hardly be completed in less than one hour, and from comments made by some of the respondents it became clear that a good deal longer was sometimes required. Apparently, some respondents spent many hours on the questionnaire.

2.5 Identification of groups of social science users

The Investigation set out to give a broad picture of the information requirements of the social sciences, and it was clearly necessary to identify social scientists and users of social science information before conducting the enquiry. It was fairly obvious that a large number were to be found in universities and other institutions of higher education; in national and local government; in certain professional societies; in certain professions such as social work; and in industry. In order to establish whether there were any other important groups of users, the British Library of Political and Economic Science was asked to record over a period of a month or so brief details of anyone who enquired for

information which could reasonably be interpreted as coming within the social sciences. The BLPES was not asked to record requests from academics. Among the enquirers, those associated with broadcasting and journalism, omitted from the preliminary working definition of groups to be surveyed, constituted an identifiable group sufficiently large to be worth surveying, though in the event it was not possible to cover them.

A national survey, to be comprehensive, must cover researchers in universities and independent research organisations, teachers in universities and other institutions of higher education, users in industry (which may include those in management as well as those in support services, for example, social welfare officers), users in government at a national and local level (distinguishing between professional and non-professional government officials), social science practitioners, the press and broadcasting, trade unions and political parties, and also users in professional societies and associations not connected with any of the above groupings. To cover all potential users of social science information systematically to any depth appeared to be clearly impractical within the project's resources of staff, time, and money. Also, the use of a single method of investigation would have been quite inappropriate for all the categories of users identified.

From the preliminary interviews it was obvious that researchers exhibited a very wide variety of information requirements, and in order to obtain any sort of accurate or complete picture large numbers of them would have to be included in the survey. On the other hand, the information requirements of practitioners appeared, from preliminary interviews, to be much more limited in range (see Research Reports Numbers 3 and 4). From an overall view of social science information systems, it is probable that the information requirements of researchers represent a total set of information, while the needs of other categories can be satisfied by subsets from this total. It seems unlikely that there are any types of social science information which would be required at any time by anyone, which was not of actual or potential use to researchers. In other words, the Investigation proceeded on the hypothesis that the information potentially required by researchers was the total information need, and comprehended all other needs. We are aware that this involves a major assumption, and that the hypothesis stated should

ideally be subjected to testing, although it is difficult to imagine what information might be required by anyone which was not of potential use to research.

2.6 Sampling

Social science researchers in the United Kingdom are mainly concentrated in universities. Perhaps 80 per cent of research is conducted there. Some evidence of this can be gained from the 3,050 projects listed in Scientific Research in British Universities and Colleges, 1966-67, Vol.3; in this 85 per cent of the projects were in universities, 6 per cent in other institutions of higher education, and 9 per cent elsewhere. The figure almost certainly exaggerates the true extent of university research, for although the volume lists projects in non-university institutions, its coverage of these may be less complete, and in any case it does not include the continuous research (concerned with day-to-day needs rather than particular projects) that goes on in government departments and in industry. Moreover, it includes some entries which appear to be research interests, rather than active research projects.

It was estimated in 1968 that the total population of university researchers was around 8,500: that is, about 3,500 university teachers and research assistants and 5,000 research students[1].

Outside the universities there are research institutions such as Political and Economic Planning (PEP) and the National Institute of Economic and Social Research (NIESR); research departments in government offices, and sometimes in local government; some research in industry; a certain amount of research in non-university

---

1 The figure is based on that given in a written answer by the Secretary of State for Education and Science on 12th May 1967 as being the number of students studying in the university faculties within the purview of SSRC during the academic year 1965-1966.

institutions of higher education, mainly carried out by teaching staff; and research done by a few individuals who are not attached to any institution (e.g. the free-lance writer, the consultant, or the school teacher writing a book in his spare time). At a rough estimate, the number of researchers in these categories is around 2,000, giving a total population of 10,500 or thereabouts.

The sampling frame for university researchers presented few problems. Research institutions and offices of national government were also relatively straightforward. The difficulty lay in the other areas where researchers were to be found scattered and in small numbers. In the event, the Investigation drew a random sample from the major areas, and added from the minor areas a selection of such individuals as could be traced. The present report deals mainly with the university researchers. Details of the methods used to obtain samples of other users are given in Research Reports nos. 2, 3 and 4.

The sample size for the questionnaire survey had to be large if it was to provide a true indication of the range and variety of information required for research. Since no comparable collection of data had been undertaken, or in fact could have been envisaged for some time, detailed analyses of the results of the survey were made in order to extract the maximum amount of information from them. Hence, large numbers of two-way and three-way analyses were required.

Ideally, a sample should be of sufficient size to ensure that any cell likely to result from any type of analysis will contain a large enough number of entries to justify statistical analysis and to enable statistically valid conclusions to be drawn. It was estimated that, allowing for some non-response, the sample would have to be at least 2,000, and in the event a sample size of 3,000 was decided upon. As it turned out, with a response rate of little more than 40 per cent, it was fortunate that a larger sample than had originally been thought necessary was drawn.

The sub-samples of university staff, research students, and researchers in other institutions were originally to be 1,500, 1,000 and 500 respectively, this being an approximate reflection of the

sizes of the overall populations, so far as could be ascertained. It was possible to adhere to this fairly strictly in the case of university staff and research students, but not in the case of researchers outside universities, because it was not possible to locate enough of them to make the sample size up to 500 without unbalancing the total sample, and using a much larger sampling fraction than the 1:3½ used for the rest of the sample.

The sample of university staff was based on the Commonwealth Universities Yearbook. This gives a comprehensive list of staff for British universities, and has the advantage over other lists that staff who move from one institution to another can be traced through the index. This, and the fact that it uses a similar layout for each institution, outweighed the disadvantage that it is always one year behind the university calendars themselves. The sample of university staff was drawn up using random numbers; a quasi-random sampling technique, taking every third and fourth name alternatively might have resulted in an unrepresentative sample, especially from small departments. Further, taking a random sample ensured that the sample reflected the existing distribution of social scientists across subjects and academic ranks.

The population for the research student sample was compiled from lists supplied by universities. A circular letter to all university registrars produced only five refusals to co-operate. Universities were specifically asked for the names of students reading for research degrees, rather than those on taught courses. Even so, some students not engaged upon research did receive questionnaires (they either returned the questionnaire with a note to say so, or replied by letter) and it is possible that university registrars may either have misinterpreted the request, or have been unable to comply with it without some considerable effort. This may have adversely affected the response rate, because the questionnaire had no relevance to those not engaged in research or teaching. There is no way of estimating this effect. The sample for research students was a quasi-random sample, because there was no question of the sample reflecting the status position of the research students.

The total population of researchers outside the universities was much more difficult to define. The most obvious source was Scientific Research in British Universities and Colleges vol.3 - Social Sciences, and it proved possible to work from the galley-proofs of the 1968 edition. Another useful source was the SSRC Annual Report, updated by the SSRC Newsletter. Annual reports and other material from the principal independent research institutes, such as NIESR, were also used.

The identification of researchers in education proved even more difficult, as education is specifically excluded from SRBUC, and the last register of research in education published by the National Foundation for Educational Research appeared in 1963. The sample was finally drawn from the current register at NFER itself (at the time unpublished, and kept on cards). Even so, using the same sampling fraction for researchers outside universities as for those in universities, the final sample size was 324 - well below the figure previously estimated.

The presence of researchers in fields outside the main social science disciplines in the replies is due to accident; although they were included in the analyses where they did occur. This occurred mainly in the case of historians and statisticians. The historians came mainly from university departments of economics and political science. The statisticians in the sample cannot be said in any sense to be representative of statisticians in the population of researchers: they came mainly from university departments of economics, psychology, and geography, where it was assumed that the primary research interest would be in economics, psychology and geography respectively. In a few cases researchers in economics or psychology were perhaps statisticians by training, or had worked with statistics or psychology as main areas of research for some time. A similar situation existed with respect to researchers whose primary research interest was physical geography. It was virtually impossible to gauge, when constructing the sample, the proportion of geographers employed in university departments of geography who were in social rather than physical geography. The same applied to historians and statisticians, and therefore these disciplines were represented, to a small degree, in the replies.

Some attempt was made to avoid physical geographers, mediaeval historians, and other researchers working in areas of the social sciences. Where there was clear evidence (as, for example, from the name of a department, or the lecturer's title) that a specific individual was definitely not a social scientist, he was excluded. However there was often no such clear indicator, and when in doubt, the principle was to include geographers and economic historians rather than to exclude them. Departments of history, as such, however, were excluded from the sampling frame.

Anthropologists, too, were given special treatment in the sample. The number of anthropology departments within comfortable travelling distance of Bath is very few. In order to preserve a group who could be interviewed as non-recipients of the questionnaire, therefore, the anthropology department at Oxford was specifically excluded from the sampling frame for the mail questionnaire. Oxford anthropologists were interviewed instead.

The timing of the survey was as follows. During May and June 1968 questionnaires and accompanying letters (see Appendix C) were sent to 1,500 university staff, 1,005 research students, and 324 researchers outside the universities. A follow-up letter (Appendix D) was sent to all those who had not returned the questionnaire two months later. In the case of university staff and researchers outside the universities a second questionnaire and covering letter were sent to those who had not replied to either letter, one month after the first follow-up letter. This was not done in the case of research students because of the transitory nature of the student population, and because of the evidence that some of the sample might be on taught courses.

Stamped addressed envelopes were sent to research students, but it was decided to send envelopes without stamps to staff on the first occasion, and also to those known to be working in government departments, technical colleges, and other organisations likely to have postal facilities for their members. (This decision was due partly to the need to keep within a budget, and partly to evidence that response rate is not greatly affected either way.) Stamped addressed envelopes were, however, included with the second follow-up letter.

2.7 Response

The response rate was low. There are many possible reasons for this. The first is lack of motivation on the part of recipients. Preliminary interviewing led to the conclusion that the social scientist is not, as yet, very information-conscious. The questionnaire itself was a long one, and some of the questions were rather complex. Even after cuts were made in the two pilot questionnaires, a long questionnaire was unavoidable, because of the necessity of collecting data over a wide range of information-seeking activities and information needs. It would have been possible to have constructed a questionnaire asking for a bare minimum of information which would almost certainly have produced a greater number of responses, but this would have been of less use. Another factor was a misunderstanding as to the purpose of the questionnaires. In spite of the fact that it was pointed out in the accompanying letter that it was not intended to submit the questionnaires to highly sophisticated statistical with claims to high validity, but rather to use them to draw broad conclusions on information needs, several letters were received from recipients who had misgivings on this very point. The rating scales proved a major stumbling block. Their purpose was to allow ranking scales to be derived, because it was impossible to ask subjects to rank more than about six or seven items. It was apparent from the replies that some of the sample thought these scales were to be used as they stood. It was possible to allay the fears of many of those who wrote in, and many of these did complete the questionnaire subsequently, but this factor must have affected the response rate adversely.

The postal service also had some effect. At least eight completed questionnaires are known to have been lost in the post; this came to light when replies were received to follow-up letters. There were also letters from subjects who received the follow-up letter, but not the first letter and questionnaire. These were mainly students, and the inference must be either that university departments failed to forward mail to research students or that the questionnaires were lost somewhere in the postal system. It is impossible to estimate the effect of this on the response rate, as there may have been many who did not receive the first letter and questionnaire, and who did not reply to the follow-up letter.

A final difficulty was a technical fault in the putting together of the questionnaire itself. It became apparent from one or two completed questionnaires that were returned in the first week or two that some of the questionnaires had been wrongly assembled. According to the printer, as many as 200 may have been affected. All questionnaires subsequently sent out were carefully checked, but the fact that some faulty questionnaires were sent out in the first place may have had an adverse effect on the response.

The actual response rate itself is not so important as the number of usable questionnaires returned. A response of more than 1,000 usable questionnaires has enabled three-way tabulations to be made. An attempt to minimize the possible bias due to non-response has been made by interviewing a number of non-respondents.

The number of completed returns was 1,089. The response rate must be calculated after taking other factors into account, as follows:

Of the university staff sample it was known that:

65 were abroad, untraceable, or retired
3 had died
11 were not doing research, or were purely administrators
6 were ill
29 were not social scientists, and refused by letter
3 completed returns were lost in the post

The total sample of 1,500 must therefore be reduced by 117.

Of the student sample it was known that:

47 were away or untraceable
1 was ill
8 were not doing research
1 was not a social scientist, and refused by letter
5 completed returns were lost in the post

Of the researchers outside universities it was known that:

37 were untraceable
1 had died
18 were not doing research
2 were not social scientists

It should be stressed that the figures above are minimal figures of persons who were unable to respond.

The research student sample must therefore be reduced to 943, and the external sample to 276. The corrected sample size is therefore 2,602, and a total of 1,089 returns represents a 41.8 per cent response rate.

The breakdown by environment is as follows:

TABLE A

RESEARCH QUESTIONNAIRE: SAMPLE AND RESPONSE

Researchers	sample (corrected)	response	%
	2602	1089	42
university staff	1383	610	44
research students	945	336	36
external	276	153	55

The response rate for students is especially disappointing. This is partly explicable by the fact, mentioned above, that communications within universities, particularly as regards part-time students, are often difficult, and there is no way of knowing how many of the sample actually received the questionnaire.

2.8 Interviews of non-respondents to questionnaire

Given the low response rate, it was necessary to make some attempts to assess the differences, if any, between respondents and non-respondents. Surprisingly, non-respondents, when approached for an interview, proved quite willing to cooperate in most cases.

It is impossible to give any quantifiable evidence of the similarity or disparity between respondents and non-respondents. Subjective

impressions gained in interview suggest that non-respondents were not atypical of social scientists as a whole. They seemed to face the same problems and were no better or worse at coping with them than were those who returned the questionnaire.

In fact, it is doubtful whether the low response rate is in this case of crucial importance. If there is any bias, it is probably in favour of those who are heavier information users and more information-conscious than the general body of social scientists; if their needs can be met, so probably can those of other researchers. Thus, while the sample may not be truly representative, the information problems and needs identified are likely to give a reasonably full and accurate picture of the situation, in the sense that a higher response rate would have added little to it.

2.9 Coding of questionnaires

A rough guide to coding was devised at the time the questionnaire was compiled and this was reproduced on each questionnaire. When the questionnaires were returned it became apparent that a much more detailed coding frame was required, and considerable effort was put into this task. A copy of the coding frame can be obtained from Bath University Library. The coding frame is self explanatory for the most part, but one or two codings need to be further explained.

Coding was undertaken largely by Mr. Cranmer with the assistance of Mrs. Joyce Line, and some (for respondents in education) by Miss V.A. Winn. Certain areas, such as the coding of the research topic in each case, were left exclusively to Mr. Cranmer.

The coding of research topic was in many ways the most difficult. To classify a topic by primary discipline, secondary discipline, and type (e.g., whether it is empirical or theoretical) is a fairly subjective procedure, and it was thought best to have a single individual making the decisions in this matter. There is no obvious way of eliminating bias on the part of the coder, as cross-checking by a second coder merely leads to fruitless argument as to whether, for example, a project entitled "Participation in local politics on Tyneside" is a sociological

topic with political overtones or a political investigation drawing on sociological theories and methods. The procedure adopted at least helped to ensure that any bias introduced during coding was at least consistent! In defence of the validity of this approach, one can cite the comparative cohesiveness of the data itself; reference to the main body of the report shows a good deal of consistency in the behaviour of the respondents when examined from the point of view of subject-specialisation. To take but one example, statisticians coded as such behave rather differently from sociologists with regard to their use of information and their information-seeking activities in not one but many respects; if coding decisions had frequently been inaccurate, this cohesiveness would not have been so apparent.

Less crucial difficulties arose in the coding of other personal details. It is not easy, for example, to equate status in a university with status in a research institute or a government department. In the last resort, a convention had to be adopted. Four main status-levels were therefore coded, as follows:

Professor	Assistant Secretary or above/Economic Adviser	Director of research
Reader/Senior Lecturer	Senior Research Officer	Senior Research Officer
Lecturer	Researcher Officer/ Principal	Research Officer
Assistant Lecturer	Assistant Research Officer/ Economic cadet	Assistant Research Officer

Full-time research staff in Universities were, of course, given separate codings.

The third matter which required clarification is the coding of degree-subjects. In order to preserve regularity, it was decided to code all subjects listed in each case, so that, for example, a respondent who read PPE for his BA at Oxford, followed by an MSc(Econ) in statistics would be coded as being qualified in economics, politics, statistics, and arts (the latter as a result of having read philosophy).

A final word should be said about the "dirtiness" of the raw data. The responses to certain questions showed that many respondents either had not read the question or had not understood it. For example, the question on book indexes frequently elicited criticisms of indexing periodicals, while the index to The Times was often cited as an indexing journal. Comments and criticisms needed to be transposed to the appropriate question very frequently. Not only did this make coding especially time-consuming, but the chance of coding error must be quite high for some of the open-ended questions.

2.10 Statistical analysis

Because the Investigation explored a good deal of new ground - especially as far as the social sciences were concerned - it was necessary to collect a large amount of data and to proceed, from the analysis point of view, in a trial and error fashion. There really was no way of telling which variables would be related, and it was necessary to undertake a number of blind analyses. In the absence of specific guidelines about the relationship of one variable with another, a good many analyses were undertaken which, in the event, proved of little interest, but this could not have been predicted. In any case, some valuable negative data has been provided by some of the analyses.

To analyse a very large amount of data, not all of it in a form most suitable for statistical analysis, it was necessary to find a suitable general purpose survey program; this existed in the form of the Multi-variate Counter (MVC) program (see Appendix E for details of MVC).

Other types of statistical analysis were considered but the computer facilities available at Bath at the time the Investigation was at the data analysis stage could not possibly have coped with the storage required for sophisticated analyses. Even after the Bath computing facilities had been considerably upgraded, there was no facility for reading-in of multi-punch data, and this was an absolute necessity for the type of data that was available.

MVC was chosen because it could cope with large amounts of low-

powered survey data, it could accept multi-punch data, and it could also accept empty cells. Some details of the capabilities and nature of the MVC program are given in Appendix F. The MVC program is capable of performing chi-squared tests upon suitable data, as well as producing two and three-way tables.

A good many other statistical analyses could have been performed upon the data, although not without some hesitation because of the quantity and nature of the data. However, in the event it would have been necessary to modify the data for other computer programs, because MVC as such could not be used. The INFROSS team were familiar with some of the more high-powered statistical techniques performed upon the data of similar survey investigations, but the quality of the data would not have justified the application of such techniques. This is not to say that sophisticated manipulation could not with advantage be performed upon some of the data (in fact in the new research project at Bath it is anticipated that a certain amount of this will be done where it is relevant).

2.11 Principal variables used in the analysis

One of the main difficulties of a research project which attempts to explore completely new territory, as already mentioned, is to decide which variables are likely to be associated with each other. Any two variables are potentially interrelated, and sets of variables must be isolated which can provide, in this Investigation, a picture of the information seeking and gathering behaviour of researchers and teachers, and of their information requirements.

Previous reports of the information requirements of scientists and engineers suggested that variables such as age, experience in research and teaching, place of work, and the type of work have an influence on information requirements. It was obviously desirable to include variables such as these that user studies in science and engineering have found relevant to information requirements.

While the Investigation was specifically designed to obtain data on the use of and need for informal as well as formal sources, it is

obviously easier to obtain valid and reliable data on formal sources, and the questionnaire is therefore weighted in this direction. This necessitated the inclusion of questions about the raw materials of research and the relative frequency with which they were used, and methods of locating references. Questions were also asked about special information problems encountered, the use made of informal communication channels, and the ratio between formal and informal channels.

Details of the major variables and characteristics included in the Investigation are given below.

Age There was reason to suppose, from the reports of many user studies, that age would be related to information requirements.

Environment Preliminary interviews suggested that environmental differences might be an important factor in determining information-seeking habits. The researcher in a government department or in a closely-knit research institute has, for example, a different set of library facilities available from the researcher in a university. The college of education lecturer does not, perhaps, have the range of specialist contacts within his institution that a university teacher has, though he may well have more colleagues who are directly interested in his research. The Oxbridge researcher has a vast range of library facilities and source materials on his doorstep, while his technological university counterpart may be seriously handicapped even in his need for back runs of major journals. More basically, the purpose and nature of research differ in different environments.

Environment was coded fairly precisely. As reference to tables in which these variables appear shows, not only were distinctions made between type of institution, but between different types of university as well. Government and industry were coded together, because it was felt that researchers in these two environments had much in common; in any event, this did not prove to be an important decision, as only one respondent was found to work in industry, and he had moved out of a government department.

Experience Three sorts of experience were coded: length of experience in teaching or research, length of experience in the institution of present employment, and length of experience in the current position held by the respondent. The last two proved not to be very informative, and could well have been omitted. It was suspected that persons with long experience would have a wider range of contacts, and generally "know the ropes" better than the junior researcher, and that this would affect information requirements.

Qualifications This characteristic was coded in two ways, by level of qualification and by subject. For the first, respondents were coded by the highest qualification held; separate

categories were used for those with a professional qualification in addition to a degree. Respondents were asked what subjects they had studied, and all these were coded. This made analysis more difficult than would have been the case if respondents had been asked to list only "honours" or "major" subjects; Scottish graduates quite frequently listed five or six disciplines.

Nature of research Respondents were asked to state what they were currently working on, and to explain briefly the method of going about their research. Where they were involved in more than one project they were asked to select one only for the purposes of the questionnaire.

Apart from the obvious desire to know what respondents were doing, this question had two purposes. The first was to set respondents thinking in terms of research processes and information needs, so that their replies to further questions would be more likely to be on the lines intended. It was evident in interviews during the preliminary stage of the project that if respondents were asked questions about their use of information without some preliminary "warm-up", they very often could not give meaningful answers, simply because they were not used to analysing their own research activities. Giving a respondent a chance to explain his research design usually gave him a basis from which to discuss his information needs.

It was also hoped to analyse the responses to this question separately, in terms of "research profiles", and to produce some sort of "ideal" type or paradigm, of the researcher in the social sciences. As it turned out, this proved impossible. The first 200 'profiles' were analysed, but no common patterns emerged. But this is in itself interesting; it does not give much indication about how social scientists work, but it does indicate that they do not go about their research in a tidy, methodical manner.

It should be stressed at the outset that the coding of this question was based on a subjective assessment of what the respondent was doing. The codings for primary and secondary research interest were a fairly simple matter; the coding of type of research was more complicated and more susceptible to error. The codings finally decided upon reflect the research interests of each respondent fairly accurately, but this part of the coding is not infallible, and small differences in behaviour between one discipline and another have therefore been discounted, because they may reflect coding error only.

Special techniques A question was included about special methodology. A good deal of subjective assessment entered into the coding of this question. For example, factor analysis might be regarded as a special technique in a relatively descriptive discipline like anthropology, while it is now a standard analytical procedure in sociology and psychology. This question did not, in fact, produce much useful data, and response rate to this question was low.

Raw materials of research Respondents were asked to list the "raw material" (meaning unpublished information, published information, experiment, etc.) which provided the basis for their research. It was hoped to show some association between different disciplines and use of information channels, and different combinations of raw materials. However nearly all respondents used nearly all types of raw data, and many could not rank them. As a result this characteristic has been little used in the analyses.

Frequency of use of various types of information, and their judged importance Respondents were asked to rate, on a ten-point scale, the extent to which they used five types of information: historical, descriptive, statistical, methodological, and conceptual. They were then asked to rate these types of information according to their importance in research. Examples of each type of information were given. It was hoped to investigate possible relationships between different types of research and the use of different types of information.

The principal difficulty with these questions is that the categories adopted are not necessarily mutually exclusive - a statistical fact, for example, can often have historical significance. This was stated in the question, and answers to the question have been interpreted in the light of this situation. Not surprisingly, the answers to these questions indicate that frequency of use and judged importance tend to coincide - people use what they regard as important - but this does not of itself invalidate the approach adopted.

The rating scales have been regrouped for the purpose of this analysis. The reasons for this, and the methodological considerations involved, have been dealt with in Appendix F.

Frequency of use of physical information channels and formats It was predicted that certain patterns of use might be associated with other characteristics, such as environment and subject of research. A list of the various possible formats and channels was produced and included in the questionnaire, and respondents were asked to rate them in a scale ranging from 0-9 (the scale has been collapsed in analysis - see Appendix F). The response rate to this question was high, and it has produced interesting results, although for "new media" the information collected is rather negative - respondents did not use videotape, microforms, etc., very often. One important omission should be mentioned; no category was originally provided for manuscript material and archives. In spite of the fact that all mentions of this source were unprompted, 13 per cent of those who answered this question stated that they used manuscript and/or archival material to some extent.

Many of the more recent communication channels listed in the questionnaire have been dropped in the tables finally produced, because many of them are hardly used at all, and further analysis would have been pointless.

Method of locating references for research Respondents were asked to rate various methods of locating references, in the same way as they made ratings in the previous question. The original scale has been collapsed (see Appendix F). The response rate to the question was high, and the respondents seem to have understood the question well. Several extra categories were added during post-coding; these were dropped at the analysis stage in view of the small number of entries.

Marginal disciplines Respondents were asked to list the disciplines they regarded as relevant to their research. The intention of this question was to see if persons who indicated that a wide range of subjects were relevant to their immediate discipline behaved differently from those who interpreted their subject narrowly. It should be stressed that in the analysis "secondary research interest" refers to the second coding given to the respondent's research topic, while "marginal discipline" refers to the subjects which were listed as being allied to the main research topic. As pointed out earlier, the research topic was coded subjectively by the coder of the questionnaire; marginal disciplines, on the other hand, were listed by the respondents, in answer to a specific question.

Chapter 3

RESULTS AND DISCUSSION

In Section 3.1 on demographic variables and characteristics of the sample of social scientists the data in the Tables 1 to 15 speak largely for themselves. There is very little interest, at least in the context of an enquiry into information requirements, in knowing the age distributions of the respondents, or their place of work, in the absence of a relationship to information requirements. For this reason comment on the demographic data as such has been kept to a minimum, although more elaborate analyses are undertaken in Sections 3.2 and 3.3 which deal with information requirements in research and in teaching respectively, where demographic and other background variables are related to information requirements.

In this chapter commentary is limited to the more important, significant (where statistical tests were applied), and interesting aspects of the data. In some instances the results are compared and contrasted with findings from other studies, and important and difficult problems that face user enquiries are discussed in the light of the data. Further interpretation is provided in Chapter 4, where suggestions are made about the way in which existing information services and systems could be improved and about the way in which developments in information services and systems for social scientists should proceed.

Comments made by respondents are introduced from time to time to illustrate certain features of the data. Respondents were specifically requested, at certain places in the questionnaire, to make comments of a general nature relating to the provision of information and access to it, and also about the problems they encountered in finding out about existing information. A number of other comments were made spontaneously in various places in the questionnaire, and some of these are reported in the following sections.

3.1 Demographic variables and characteristics of population

The characteristics of the sample are meaningful only in the context of the sampling procedure. It must be emphasized that the Investigation concentrated upon university-based social scientists. Within this limited environment a random sample was taken. Social scientists employed in government departments, in colleges of education, and other institutions were not drawn at random. For this reason the characteristics of the sample cannot be generalized to all social scientists in the United Kingdom, although there is some indication that the sample tallies reasonably with estimates of the UK population of social scientists - for example, the Association of University Teachers (1965) breakdown of university staff according to age, grade, and length of service, and a survey by Carter (1968), in association with the British Sociological Association, of sociological research in Britain.

3.1.1 Age distribution of respondents

More respondents fell into the younger age groups than into the older ones. Table 3 shows that 39 per cent of respondents were in the 21-30 age group, 33 per cent in the 31-40 age group, 20 per cent in the 41-50 age group, and only 8 per cent were aged 51 or over. When the variable of age was tabulated against primary research interest, 64 per cent of those in statistics and mathematics were in the youngest age range, whereas only 13 per cent of those with a primary research interest in education fell into this age range.

3.1.2 Qualifications of respondents

It can be seen from Table 4 that only 1 per cent of respondents had no qualifications at all, 18 per cent had a doctoral degree, 23 per cent a master's degree, and the remaining respondents had a bachelor's degree only, a first degree combined with professional qualifications, or professional qualifications only. There were more higher degrees in anthropology, geography, politics, and history than in the other disciplines and fewer than average higher degrees in economics, education,

sociology, and statistics. The fact that researchers in statistics were on average younger than other researchers may account for the relatively small proportion of higher degrees in statistics.

As expected there was a strong link between the subject of research and the subject in which a researcher was qualified (Table 5). For example, of the 263 respondents with a qualification in economics, 60 per cent were doing research in economics, 15 per cent in sociology, and 10 per cent in politics. Sociologists were the least flexible in this respect: respondents with a qualification in sociology were more likely to undertake research in sociology than were respondents in other disciplines likely to undertake research in the subject in which they were qualified. For example, of the 154 respondents with a qualification in sociology, 73 per cent were researching in sociology, 8 per cent in psychology, and 7 per cent in education. At the other extreme those qualified in anthropology were more likely than any other group to do research outside their own discipline: only 3 per cent were researching in anthropology, whereas 22 per cent had moved into sociology. In the case of political science 48 per cent of those with a qualification in this subject also did research in it; the other half were about equally divided between economics and sociology. That only 19 per cent of researchers with a qualification in statistics or mathematics had a primary research interest in statistics is largely explained by the fact that no attempt was made to sample mathematicians or statisticians; if any turned up in the sample it was a matter of accident (see 2.6).

3.1.3 Status, research experience, and subject of research

The data in Table 6 give a breakdown of the status of respondents according to their primary research interest. Where respondents came from non-university establishments they were graded in accordance with equivalent university rankings (see 2.9). 7 per cent of respondents were professors, 18 per cent readers or senior lecturers, 42 per cent lecturers, and 17 per cent research students.

There were one or two subjects that departed from this general pattern, especially anthropology, education, and psychology. For

example, 40 per cent of respondents with a research interest in anthropology were research students (compared with 17 per cent of the total sample). There were fewer respondents with professorial status with research interests in anthropology, education, and psychology than in the other six areas of research. Apart from these exceptions, there was little association between status and research interest: the nine major research interests coded were fairly well distributed across the nine status levels.

The relationship between experience in research and subject of research is given in Table 7. At one extreme only 3 per cent of respondents had research experience going back to 1940 or before, and at the other extreme only 1 per cent had less than one year's research experience. About 25 per cent of respondents had between 8 and 17 years of research experience. Economists tended to be slightly more experienced in research than others. The length of research experience of respondents with one research interest was very similar to those with more than one research interest.

3.1.4 Environmental differences

With one or two exceptions subject of research was unrelated to environment (Table 8). Anthropologists were much more likely to be found in Oxbridge than in any other institution[1] and there were no anthropologists in government departments or research institutions. Respondents researching in education tended to be at colleges of education and redbrick universities. Psychology was strongly represented at the technological universities, the Scottish universities, and in government departments. Sociology was strong at Cambridge and Oxford, at the new universities, and among independent researchers. There were no respondents doing research in anthropology, economics, or statistics at colleges of education. Independent researchers worked

---

[1] All the Oxbridge anthropologists in the sample of researchers/teachers receiving a questionnaire were in fact at Cambridge; Oxford was specifically excluded, so as to provide a group of anthropologists to interview. But even so the category "Oxbridge" produced more anthropologists than did any of the other categories.

almost exclusively in education or sociology.

There was also little relationship between place of work and subjects studied for degree (Table 9). With the exceptions of anthropology, statistics, and education, there was little association between subjects studied for a degree and the university or institution in which the respondents worked. Those with a qualification in anthropology tended to be found in Oxbridge, and those with qualifications in statistics and mathematics were more likely to come from redbrick universities than other universities (54 per cent of the 41 respondents with qualifications in statistics and mathematics came from redbrick universities). Respondents in colleges of education were more likely to have qualifications in education than in any other subject. Colleges of education accounted for only 2 per cent of respondents with qualifications in economics, 3 per cent with qualifications in politics, and 3 per cent with qualifications in psychology, but accounted for 17 per cent of respondents with qualifications in education. Government departments employed social scientists with qualifications in economics, psychology, sociology, statistics and mathematics, arts subjects, and science subjects, but there were no respondents from government departments with qualifications in education or economic history.

The majority of respondents had served from one to four years in the institution in which they worked at the time they received the questionnaire. 24 per cent of the sample were either research students, research assistants, or assistant lecturers. The average length of time in present employment did not vary much from one institution to another (Table 10).

There was an association (Table 11) between environment and level of qualification. If highest degree only is considered (and respondents with a degree plus professional qualifications are disregarded), 51 per cent of respondents had a first degree, 24 per cent an MA, and 20 per cent a PhD. Respondents from London colleges, redbrick universities, and new universities were more highly qualified than respondents from other places. The least qualified came from the technological universities. Oxford and Cambridge had a high proportion of respondents with BA degrees only, but this was accounted for by the large

number of research students from these universities included in the sample.

Table 12 gives some data about the relationship between institution of employment and status. Nearly half (45 per cent) of the total respondents were lecturers, 18 per cent readers or senior lecturers, 7 per cent professors, and 15 per cent students. There were few differences between environments in this respect. Exceptions were Oxbridge, where 49 per cent of respondents were research students, and London, where 23 per cent of respondents were research students. Thus there are proportionately twice as many research students in the sample from Oxbridge as from any other institution.

Thirty-five per cent of respondents stated that they worked for more than twenty-eight hours per week on average on their research projects, and there was little variation between environments for the average time spent on research, with the exception of respondents from colleges of education who spent much less time on research. The relationship in Table 13 between time spent on research and place of work is significant. Some respondents had more than one research interest, and if this is taken into account, it is probable that a good number of respondents worked for more than twenty-eight hours per week on research.

Nearly half of the respondents (45 per cent) worked on research projects that had no time limit (Table 14). This was particularly noticeable in universities. In government departments and research institutes about half the respondents had a time limit of between one and two years imposed. This contrasted with the 26 per cent of respondents from the London colleges and 33 per cent from the redbrick universities who reported a time limit of between one and two years. There was a tendency for more time limits to be imposed on the research of respondents from Oxbridge, where 44 per cent fell into the one to two year time limit, but again this can be accounted for by the high proportion of research students in the sample coming from Oxbridge. Even so, the relationship between time limit and environment is not significant.

3.1.5 Details about research activities

Respondents were asked to state the exact nature of the research they were engaged in, or if they were not engaged in research at the time of answering the questionnaire, to give details of research they had completed, or been involved with, during the preceding six months. Answers to this question were coded to produce details about primary and secondary research interests, and type of research (e.g. applied, theoretical, statistical). Details about the way in which answers to this question were coded are given in 2.10.

Research activity is grouped together here with demographic variables and other characteristics of the sample because it can be postulated that along with these variables, it is related to information requirements and, furthermore, that it is a factor that may be differentially associated with information seeking and gathering behaviours.

It is most unlikely that the established information seeking and gathering behaviours of researchers determine their place or work, the subject of their research, etc., although it is quite possible that the choice of place of work and subject of research are influenced, at least to some extent, by the availability of material, by the location of special collections, and other factors associated with information resources and services. There is evidence from the interviews that a number of researchers in anthropology chose Oxford because of the material available there, the existence of a special centre for work in anthropology, and the expected informal contacts that could be made in Oxford but nowhere else (according to some of the interviewees). But this represents an exceptional case and there was little other evidence, either from the questionnaire data or the interviews, that researchers in other disciplines were influenced to the same extent in their choice of location for research. In the major social science disciplines suitable contacts can be made in a wide variety of locations and institutions.

In short, it was assumed that, at the time of the enquiry, the majority of researchers had established their subject of research (as well as the institution in which they worked), and that information

requirements might be partly dependent upon these factors. In other words, the factors of the age of respondents, research experience, place of work, and nature and type of research can be viewed as independent variables which may determine the various information requirements and methods of obtaining information (for example, raw materials of research, type of information used, channels used to trace information, methods of locating references for research, etc.). It was not forgotten that the existence of special collections, availability of material and information services, as well as researchers' expectations about the amount of material in foreign languages, might in some cases have influenced choice of research topic, or location for research; but it was supposed, and the data supported this, that in the majority of cases the relationship would be the other way round: that is, the type of research would influence the type of information required, and the availability of certain types of material would have very little effect upon choice of research topic.

However, there was no clear relationship between different types of research and information requirements and information habits. This is not surprising, because no such strong relationship has appeared in other user studies. This is also the case with respect to the relationship between demographic and background factors of users and information requirements. Except in exceptional circumstances, a case in point being the example given above of anthropologists, there was no very strong relationship between background variables and information requirements.

Many respondents had more than one major research interest, and answers to the question about research were coded to give details about secondary research interests. When the variables of primary and secondary research interest were tabulated against one another (Table 2), primary and secondary research interests often fell into the same broad subject field. For example, of the 190 respondents with a primary research interest in economics, 65 (i.e. 34 per cent) had a secondary research interest in economics. Of the 124 respondents with a primary research interest in psychology, about half gave psychology as their secondary research interest. On the other hand, a primary research interest in anthropology was often associated with a secondary research

interest in sociology: a primary interest in economics was associated with a secondary research interest in either economics, statistics, or history; a primary research interest in education was associated with secondary research interests in psychology and sociology; and political science was associated with secondary research interests in politics, sociology, and education. Sociologists rarely gave psychology as a secondary research interest. All types of geographers were not equally represented in the sample; only geographers working in aspects of geography closely related to the social sciences were deliberately included. Geographers with interests in climatology, geomorphology, and other aspects of physical geography, were excluded.

3.2 Information requirements for research

The questionnaire contained two distinct sections: the first dealing with information required for research and the second with information required for teaching.

3.2.1 Structure of questionnaire and emphasis on formal channels of communication

The questionnaire contained sections dealing with every major aspect of information usage and information requirements, although there were more questions relating to formal than to informal channels of communication (see 2.4 for details on construction of questionnaire).

The primary literature contained in journals and monographs has been at the centre of the communications network for researchers in all forms of scholarship, including the experimentally based sciences, for a very long time. The journal article has been accepted as the archival source in which the results of experiment and the theories and concepts of scientists have been published since the 18th century, and as the social sciences have developed in the 19th and 20th centuries they have followed, in the main, this tradition. During the last two decades the pre-eminence of the journal article as the main source of communication between researchers has been questioned, and there is now a good deal of evidence to show that much of the information that flows from one researcher to another takes place through informal channels of communication:

for example, face-to-face contacts, correspondence, telephone conversations, and exchange of manuscripts. This situation holds true for the social sciences as well as for the sciences and technologies. However, interest in, and the status accorded to, the primary journal do not appear to be diminishing: many new titles continue to appear in social science serials and monographs, and serials appear more frequently and contain more pages per issue. The secondary literature also, naturally, continues to grow.

There is still much that could be done to improve the formal system, and to educate users to make fuller and more appropriate use of existing bibliographical tools. Little is known about the relationship between the formal and the informal system: it may be possible to integrate the two systems, or relate them more closely to one another. Technical advances in the production of printed material, in automatic indexing, and in the compilation of abstracting and indexing journals will continue, and may well contribute to greater bibliographical control in the future where, for example, the entries made in the primary literature may be directly related to abstracting and indexing journals at the same time as the primary journals are produced. There are also large areas in which much work remains to be done in the field of classification and indexing and in the application of automation to these processes. These aspects of the formal system will occupy the attention of researchers in documentation and information science for many years to come, and the results of user studies can be expected to make a contribution to the development of the formal system.

It is data relevant to the questions above that has been obtained in the present Investigation, and which, appropriately, can be used in the design stages of information systems. This is not to say that the informal system is not very important; however, the field is very poorly charted at present, and by definition informal communication is more flexible and fluid than the formal system, so that precise questions of any validity were almost impossible to formulate. Although some questions were included on informal communication, they are both less numerous and less "hard" than questions on the formal system.

3.2.2 The raw materials of research (Question number 12)

Respondents were asked to state the "raw materials" of their current research. Respondents were asked to mark as many of the six types of raw material (e.g. unpublished documents, published documents, data gathered from experimental observation) as were relevant to their research. Not all respondents understood what was meant by "raw materials", as was evident from some responses; it is impossible to say how far misunderstanding may have affected the answers to the question.

In Table 20 it can be seen that 57 per cent of respondents used unpublished documents, 69 per cent used published documents and 46 per cent used data from experiments or observations.

Unpublished documents were used to about the same extent by researchers in all subjects, and the same was true for published documents. Respondents with a primary research interest in psychology were much more likely to use data from experiment and observation than were other researchers. Economists were much less likely than average to use this type of material. Sociologists, but not psychologists it was noted, relied heavily upon data gained from interviews and questionnaire surveys for their raw material of research.

Mathematical models and computer simulation techniques were used by 160 respondents; these were mainly researchers in economics and statistics.

Only 22 respondents used maps; these were all researchers in education and geography. However, this was not a type of raw material specifically listed, and some users of maps may not have thought to mention them here, especially as they were listed in question 17: when the questionnaire was drafted maps were not considered as a "raw material" (they were either "unpublished documents" or "published documents").

There were 47 respondents (5 per cent) who said they used other types of raw material for research.

The type of raw material used in research was unrelated to the status of the researcher: for example, researchers of professorial status were as likely to use material gathered by experiment or observation as were research students or lecturers.

All types of raw material were used in every type of research (Table 21). Where research was theoretical there was a greater use than average for the sample of published material, and less than average use of data gained from experiments or from surveys, although researchers working at the theoretical level did make use of some experimental and survey data. Researchers whose type of research was historical were more likely than average to make use of unpublished material, and also made fairly heavy use of published material. The overriding tendency was for researchers, whether their research was at the theoretical, applied, statistical, comparative or international level, to use <u>all</u> types of raw material for their research. It was not the case that a particular type of research was associated exclusively with with one particular type of material, or vice versa. For example, it was not the case that applied researchers used only published and experimental material and neglected unpublished material.

It is appropriate to mention here that information seeking and gathering of any sort was largely unrelated to the type of raw material used in research.

3.2.3 Different types of information and their use (Question number 15)

Respondents were asked to rate the extent to which they used five types of information: historical, descriptive, statistical, methodological, and conceptual. They were also asked to rate these types of information according to their importance in research.

About one quarter of the respondents stated that they "never used" historical and descriptive data in their current research. The other three categories, "rarely used", "occasionally used", and

"often used" accounted for one quarter of the responses each. Statistical, methodological, and conceptual types of information were used by all respondents much more frequently. Within each of these types, about half the respondents fell into the "often used" category and only about 10 per cent into the "not used" category.

There were environmental and disciplinary differences in the frequency with which these types of material were used. The most striking differences were between university and non-university establishments, rather than between individual universities. All research institutions, with the exception of government departments and industry, followed the general pattern (Table 22) in the extent to which they made use of historical material. Just over half of respondents from government departments never used historical material, and only 3 per cent used historical material frequently. Respondents from colleges of education and research institutions made less use of historical data than other establishments. All respondents made some use of descriptive data, but again, government departments made less use of this type of information than other institutions (Table 23). Statistical material was used frequently irrespective of institution (Table 24). Government departments especially made heavy use of statistical material; every respondent from the government departments used statistical data, and 90 per cent made frequent use of statistical data.

In terms of subject of research, economists were the heaviest users of statistical data, followed closely by geographers. At the other extreme, only 19 per cent of anthropologists made frequent use of statistical data. 18 per cent of respondents conducting research in statistics/mathematics stated that they never used statistical data.

Nearly all respondents, regardless of institution or subject of research, used both methodological and conceptual material (Tables 25 and 26). Only 15 per cent of respondents never used methodological material, and only 7 per cent never used conceptual material. There were few environmental differences in this respect, but there were differences between research subjects in the frequency of use of

conceptual and methodological material (Tables 30 and 31). Psychologists were by far the heaviest users of conceptual and methodological material; 95 per cent of respondents with a primary research interest in psychology used methodological material (64 per cent did so often), and 98 per cent used conceptual material (70 per cent did so often). This finding supports the view often expressed that psychology is much concerned with methodological issues. Twenty-nine per cent of respondents with a primary research interest in political science stated they never used methodological material, but they were average users of conceptual material. These respondents had primary and secondary research interests in politics, rather than, as with other political scientists, a research interest in politics and history. Geography and historians used conceptual and methodological material relatively infrequently.

When the data on the use of the various types of information were broken down according to marginal disciplines, a similar pattern of usage was seen (Tables 32 and 33). Researchers with a marginal interest in history and literature were heavy users of historical data, and most respondents citing psychology and biology as marginal disciplines made no use at all of historical data. 46 per cent of respondents with a marginal interest in education said that they never used historical material. There was little of interest in the relationship between the use of descriptive data and marginal interests: no single interest was associated with very heavy usage of descriptive material, although accountancy, literature, and biology, given as subjects of marginal interest, were associated with non-use of this type of material.

Economics and biology as marginal disciplines were associated with heavy use of statistical material, as were accountancy, social administration, and computing; but the absolute numbers of respondents in these last three categories were very small, 12 citing accountancy as a marginal discipline, 12 social administration and 21 computing.

There was only a weak association between marginal disciplines and frequency of use of conceptual and methodological material. When the use of these materials was broken down by primary interest,

it has already been pointed out that psychologists were very conspicuous by the frequency with which they used these types of material, but this is not true of those with a marginal interest in psychology; 48 per cent of all respondents frequently used conceptual material, while of the 198 respondents who mentioned psychology as a marginal discipline, only 58 per cent - not a very much higher proportion - than average stated that they frequently used conceptual material. Likewise for methodological material: 39 per cent of all respondents stated that they frequently used this type of material, and of those with a marginal interest in psychology 43 per cent stated that they did so.

Two cases stood out, where there was a much stronger association between marginal disciplines cited and frequency of use of conceptual and methodological material. Of the 60 respondents who gave biology as a marginal discipline, 75 per cent used methodological material frequently, and 62 per cent conceptual material. The other strong association was between philosophy as a marginal discipline and frequency of use of conceptual material: 40 of the 47 respondents who had a marginal interest in philosophy made heavy use of conceptual material. An examination of the three-way tabulation (Table 35) between use of information types, primary research interest, and marginal disciplines showed that more than two thirds of those in the sample who had an interest in biology or medicine were psychologists. No strong association emerged between primary discipline, marginal interest in philosophy and heavy use of conceptual material. Respondents with a secondary interest in philosophy were divided more or less evenly between anthropology, education, politics, psychology, and sociology, and all these subject groups used conceptual material fairly heavily (Table 35).

Some idea of the information requirements of interdisciplinary areas can be obtained from Tables 36 and 37 where education, sociology, history, and economics as primary and secondary research interests are tabulated against the frequency of use of information types. The investigation did not set out explicitly to investigate the information requirements of researchers working in interdisciplinary fields: for example, no attempt was made to identify researchers interested in psycho-linguistics, sociology of

education, or economic history as such. However, it was hoped that a combination of primary research interest in (say) education and a secondary research interest in sociology would implicitly identify a number of persons who would call their discipline sociology of education or who could at least be included under that research heading. Likewise, cross-tabulating primary and secondary research interests in economics and history should give some idea of the information requirements of researchers in economic history. Furthermore, in the case of sociology of education, it is possible to compare the information requirements of researchers with a primary interest in education and a secondary interest in sociology, with researchers whose primary interest is in sociology. A similar comparison cannot be made in the case of researchers interested in economic history because the investigation set out to sample only economists, not those with a primary interest in history or a qualification in history; history therefore appeared mainly as a secondary or marginal interest.

There were 16 respondents who had a primary interest in sociology and a secondary research interest in education, and 24 who had a primary research interest in education and a secondary research interest in sociology. 107 respondents had a secondary research interest in education, compared with 233 with a secondary research interest in sociology.

When sociology and education are cross-tabulated as primary and secondary research interests, it can be seen that educationalists with a secondary research interest in sociology follow a similar pattern to sociologists with a secondary research interest in education, with respect to the frequency with which they use different types of material. This is especially the case for statistical, methodological and conceptual material. In the case of historical and descriptive material there are some differences. The researchers in education interested in sociology were less likely to use historical and descriptive material than the sociologists interested in education. But it should be pointed out that these differences are small, and they are based upon a small number of cases. The number of persons who could be identified as sociology

of education researchers in this Investigation is no more than 40 at the most, and it is most unlikely that all respondents at the intersection of sociology and education could be so classified.

In the same way, researchers interested in economic history can be analysed. There were 37 respondents with a primary interest in economics who had a secondary research interest in history, and 16 respondents with a primary research interest in history and a secondary research interest in economics (although, as stated, the Investigation did not set out to sample researchers in history, a number were coded as such). Nearly three quarters of the economic historians made frequent use of historical data, and all but one researcher falling into this category made at least some use of historical data. On the other hand, only 25 per cent of the researchers whose primary and secondary research interests were in economics made frequent use of historical data. Economic historians made frequent use of descriptive data; and economists also made some use of descriptive data. Economic historians used statistical and methodological material with just about the same frequency as the economists, although economists made a good deal more use of conceptual material than economic historians. The picture emerges of economic historians making great use of historical material, to a lesser extent descriptive material, and making a good deal of use of statistical material (as indeed do most social scientists), but having only a very average interest in conceptual material, in this last respect contrasting quite markedly with the economists in mainstream economics.

Some of the respondents with a primary interest in economics and a secondary research interest in statistics may have been working in the field of econometrics. The economist/statistician made some use, as did the mainstream economist, of historical material; he made rather less use of descriptive material than the economist, made a greater demand for statistical material and methodological material, and about the same demand for conceptual material.

Only 11 respondents in the sample had a primary interest in sociology and a secondary interest in politics, and full cross-tabulations for these respondents were not therefore made. The frequency of use of information types by respondents with a primary and secondary research interest in sociology was, however, contrasted with that by respondents with a primary interest in political science and a secondary interest in sociology (there were 23 in this latter category). There is an indication that the political scientist interested in sociology made greater use of historical material than did the mainstream sociologist, less frequent use of descriptive material, about the same use of statistical and methodological material, and rather more use of conceptual material. However, these differences were not very large.

As explained, the method used in this survey to identify the information requirements of researchers in interdisciplinary areas is very crude: the cross-tabulation of primary and secondary research interests does not ensure that researchers in truly inter-disciplinary areas have been identified. From these analyses it looks as though the information requirements for interdisciplinary research follow the same broad pattern as the established social science disciplines. There is obviously much more that could be done in the area of interdisciplinary research; it is possible that bibliometric work would, in the first instance, be a good way of identifying the boundaries of the interdisciplinary areas.

3.2.4 Different types of information and their judged importance (Question number 16)

From the preceding analyses it can be seen that opinions about information requirements of social scientists may not always be supported by empirical data. 91 per cent of respondents used statistical material, and over half used it frequently in their research. It was assumed that the heaviest users of statistics would be economists, and perhaps social scientists in government departments (which were more likely to employ economists than any other social scientists). This proved to be the case, but other researchers were heavy users of statistical data as well: 81 per

cent of anthropologists, 90 per cent of educationalists, 84 per cent of political scientists, and 91 per cent of psychologists stated that they used statistical data, although not as frequently as those in economics and geography. This heavy use of statistics in 'soft' disciplines such as anthropology and education is worth noting.

When the frequency of use of different types of material was tabulated against judged importance of types of material for current research (Tables 38-42), the responses were not distributed throughout the tables at random. The chi-square values for each table were significant at the 0.001 level, and, as was expected, the majority of respondents fell along the diagonal. This indicates a high correlation between the frequency of use of material and judged importance of material for research, for all five types of information.

There were also some environmental and disciplinary differences in the ratings of importance of the various types of materials (Tables 43-57), but the differences were fairly small.

Few social scientists in government departments and non-university research institutions judged historical material to be important for their research. There were 30 respondents from government departments who used historical data and 54 from non-university research institutions, but only 3 per cent of the former and 7 per cent of the latter regarded historical data as important. Of all respondents, 28 per cent rated historical data as "very important", 18 per cent as "somewhat important", and 26 per cent as "of little importance". 28 per cent did not use historical data at all.

A similar pattern was seen for importance of descriptive material. Again, government social scientists did not often find descriptive data very important for their research. Researchers in non-university research institutions followed the same pattern as other researchers with respect to judged importance of descriptive data. Respondents from colleges of education were the most conspicuous deviants from the general pattern, because only 5 per

cent of them (as opposed to an overall figure of 22 per cent) regarded descriptive data as important.

Ratings of the importance of statistical, conceptual, and methodological material followed an overall pattern similar to ratings of the frequency of use of these types of material. As the majority used these three types of material frequently, so the majority rated these three types of material as important. This can be seen in Tables 45, 46, and 47, where, for example, 58 per cent of respondents rated statistical material as very important, 20 per cent rated it as moderately important, and only 12 per cent rated it as not very important.

There were environmental differences in the rated importance of material. For example, 80 per cent of government social scientists judged statistical material to be very important. One difference between universities is perhaps worth noting: 41 per cent of respondents from Oxbridge judged statistical material to be very important, compared with 58 per cent of all respondents.

When the judged importance of conceptual and methodological materials was tabulated against research environment, the distribution of respondents in these tables did not depart significantly from a random distribution, although it is interesting to note that respondents from the new and technological universities rated conceptual material as more important than did other respondents (Table 47). Respondents from the Scottish universities were more likely to rate methodological material as important than were other respondents (Table 46). But in the main there was only a weak relationship between research environment and judged importance of types of material.

When the importance of types of material was broken down according to primary research interests (Tables 43-57) much the same pattern was found across subjects of research as in the breakdown of the frequency of usage of different types of material according to primary research interest. One or two features can be highlighted. About one quarter of all respondents rated historical

material as very important for their research. Political scientists were the only group to show much deviation from the general pattern. Just over half of the political scientists regarded historical material as very important; and, of course, the majority (91 per cent) of respondents in history regarded this type of material as very important. The overall pattern for the use of descriptive data was similar, although anthropologists and sociologists were more likely than other social scientists to regard this material as very important for their research. In the case of statistical, methodological, and conceptual materials, more respondents regarded these types of material as very important than as of moderate or little importance. Economists and geographers were much more likely than any other researchers to rate statistical material as very important; and historians and anthropologists less likely to rate this type of material as very important. Psychologists again were noticeably different in their use of methodological and conceptual material: 68 per cent and 70 per cent rated these two types of material respectively as very important to their research. Anthropologists did not regard methodological material as very important, nor, surprisingly perhaps, did political scientists. More than an average proportion of anthropologists rated conceptual material as important. Not many geographers rated conceptual material as important, nor did historians. Apart from these deviations, the breakdown of ratings for conceptual and methodological material was much the same for all primary research interests.

Tables were also compiled to show the relationship between the importance of various types of material and marginal disciplines cited (Tables 53-57). The general pattern here was very similar to that found when the frequency of use of material was tabulated against marginal disciplines, and against the number of marginal disciplines mentioned. Those respondents who gave economics, statistics and literature as marginal disciplines tended to rate historical data as very important, while only a few of the respondents who gave education, biology, and psychology as marginal

disciplines rated historical data as important. Over 40 per cent of those with marginal interests in anthropology, political science, history, and the arts rated descriptive data as very important. Those respondents with marginal interests in economics, economic history, science, mathematics and statistics, and accountancy rated statistical data as very important. Methodological material was rated very important for the majority of respondents with a marginal interest in education, biology, and mathematics and statistics. Nearly all those with a marginal interest in philosophy rated conceptual material as very important. Respondents who gave biology, psychology, and education as marginal disciplines were more likely than average to rate conceptual material as very important.

The possibility of contrasting disciplines given as main and marginal points to a useful method for teasing out the complex relationship that exists between subject of research and information requirements. The relationship is complex because all types of material are required, to a greater or lesser extent, in all areas of research. The majority of social scientists, irrespective of discipline, require some statistical and methodological material, and only slightly fewer require historical, descriptive and conceptual types of material.

When the requirements for different types of material associated with marginal disciplines are contrasted with requirements in main areas of research, some interesting differences emerge. Psychologists were heavy users of methodological material, but other social scientists giving psychology as a marginal discipline did not stand out in this respect. Researchers in statistics[1] made less use of statistical material (18 per cent of respondents coded as researchers in statistics/mathematics did not use statistical material at all) than most other respondents, but those who gave statistics as a marginal discipline, made greater than average use of statistical material.

---

1 Statisticians were not deliberately included in the sample, but some replied to the questionnaire and were coded as such.

3.2.5 The use of physical forms (Question number 17)

Respondents were asked to rate the extent to which they used various physical forms (e.g. periodicals, books, theses, maps) during their research.

The data in Table 58 give an overall picture of the frequency of use of each form of "packaging". In general the data substantiate impressions from the interviews that periodicals and books were very frequently used in research; research reports, theses, newspapers, and government publications, were less frequently used; maps, films, video tape, etc. were not used at all by the majority. It is in fact interesting to look at the number of respondents who never used each of the physical forms. Only 3 per cent of respondents never used periodicals and 3 per cent never used monographs. A separate category existed for books in the form of collections and conference proceedings; slightly more respondents (13 per cent) never used this form. Other types of printed material were less popular; for example, 21 per cent never used research reports, 29 per cent never used theses, and 36 per cent never used newspapers. Government publications were used fairly frequently; only 23 per cent of respondents stated that they never used this form of material, and 34 per cent stated that they used them very frequently. Non-print materials were used very infrequently: 74 per cent of respondents stated that they never used microfilms in research. Similar figures (all of the percentages represent non-users) were obtained for maps (63 per cent), films (93 per cent), recorded sound on tape (85 per cent), video tape (97 per cent), and other pictorial forms (76 per cent).

The use of computer printout followed a slightly different pattern. Although 62 per cent of the sample said they never used this type of material, 56 per cent of those who did do so used it frequently.

Radio and TV were not used by 78 per cent of respondents, but of those that did use these media, 68 per cent used them frequently. The use of radio or TV must be regarded as a very marginal channel for social science research; the users tended to be political scientists, sociologists, or researchers in education.

The data on the use of informal channels of communication are in close agreement with other reports that have demonstrated the importance and frequent use of informal networks (see, for example, Price, 1961; Price and Beaver, 1966; Garvey and Griffith, 1968; Menzel, 1968). Only 15 per cent of the respondents said that they never communicated with colleagues in their own institutions about their research, and 16 per cent said they never did so with colleagues elsewhere. Respondents were about equally divided between the three categories of frequency of use. This was true of communications with colleagues in own institution as well as colleagues elsewhere. In the light of other reports about communication through informal channels, it might have been expected that researchers would communicate with colleagues in their own institutions more often than with persons elsewhere, but this was not so.

The data cast doubt upon the role of conferences in the exchange of scientific information. 41 per cent of the sample replied that they never used conferences as a means of gathering information for research. However, respondents may have interpreted the question rigidly (in the sense of "deliberate information seeking"), or they may have construed the relevance of information collected at conferences in a very narrow sense. It must be admitted, however, that the data lend little support to the hypothesis that conferences play a large part in the transmission of social science information. It may be however that conferences play an important part in alerting delegates to relevant information.

The data relating to the use of physical forms (including informal channels of communication), were broken down according to respondents' institution. No table is provided for this analysis, because there were few differences between institutions with respect to the use of physical forms. This applied to all categories of users, including government social scientists and college of education respondents. There were just one or two minor deviations from the average pattern. Respondents from government departments were less likely to use periodicals and monographs than were the others; but they made more use of maps. They did not differ from respondents in other institutions with respect to use of other physical forms. Respondents from colleges of education

made greater use of theses and films relative to other physical forms than did other respondents. Those from the new universities were more likely to use microfilm than respondents from the other universities. A disproportionately large number of respondents from Oxbridge gave more responses in the "frequently used" category for microfilm and video-tape. There were few environmental differences relating to participation in informal communication networks.

The relationship between primary research interest and frequency of use of physical forms is given in Table 59. Print-media (e.g. books, newspapers, periodicals) are considered first. Economists stood apart from other users, as they did not use monographs and theses as frequently as others, but were much more likely to use government publications. Political scientists were also heavy users of government publications, although not as heavy as economists. Researchers in education made little use of books which contained collections of readings and conference proceedings, and more than average use of research reports and theses. Research reports were used frequently by psychologists, who were also heavy users of periodicals, and (in contrast to researchers in education) made heavy use of collections of readings and conference proceedings. Psychologists also made infrequent use of newspapers and government publications. Sociologists were fairly heavy users of newspapers, and political scientists even more so. Geographers, not surprisingly, made very heavy use of maps: 71 per cent of the heavy users of maps were geographers.

Only a small minority of respondents made use of the more unusual print-media, and when this variable was tabulated against other variables, the numbers in many of the cells were too small to allow conclusions to be drawn. Only 7 per cent of respondents used film, 15 per cent recorded sound, and only 3 per cent used video-tape.

There was little relationship between the use of physical forms and subject of research. In the main respondents were distributed throughout the table at random, indicating that any particular type of material was as useful to one subject specialist as another. There were two cases

where a physical form was particularly suited to a discipline - maps for geographers, and computers for economists.

It is not possible at present to make predictions about the future use of new media, as the necessary hardware is not yet widely available, and researchers have had little experience with them.

Secondly, the use of informal channels of communication may be considered. There were differences between different subjects. 54 per cent of the political scientists, 52 per cent of the economists, 40 per cent of the anthropologists, 42 per cent of the sociologists, and 91 per cent of those researching in history stated that conferences were of no use for their research. (It must be remembered that respondents were asked to rate conferences, amongst other things, according to the extent to which they used them during their current research.) On the other hand, researchers in education, geographers, and psychologists rated this form of communication important to their research; as many as 72 per cent of psychologists said conferences were useful, and 17 per cent found conferences very useful in their research. It has often been maintained that conferences are a useful channel for the exchange of information; the data here would seem to indicate, at least in some subjects, evidence to the contrary.

Nearly all respondents communicated fairly often with colleagues in their own and other institutions. Geographers and political scientists made the least use of colleagues in their own institutions, and psychologists and sociologists the most. Economists made infrequent use of persons outside their own institution, political scientists less than average use, and sociologists an appreciably greater use than average.

In Table 103 the use of raw materials of research (e.g. unpublished documents, data from experiment, survey) was related to use of physical forms. When the raw materials were experimental data, the physical forms of periodicals, books, research reports, theses, newspapers, and government publications, were used in a different way than when the raw materials of research were unpublished or published material. The

distinction that was made in coding between, on the one hand unpublished material, and on the other hand empirically derived data from experiments, interviews, and surveys conducted by the respondent himself, is somewhat arbitrary, but it is necessary to make a distinction between the researcher who uses the writings (and data) of other workers and a researcher who uses data gathered in his own experiment or observation, because the latter category made greater than average use of research reports and periodicals, and less than average use of newspapers and government publications. Psychologists were more likely to use data generated in experiments than other social scientists, and it has already been reported that these respondents relied heavily upon periodical literature (also see 3.2.9 on use of abstracting and indexing journals) and made much less use than other social scientists of newspapers and government publications. Psychologists also made heavy use of research reports. Economists, social geographers, sociologists, and some political scientists also used experimentally derived data as a basic material for research.

It can be concluded that all researchers used the print media frequently. The newer physical forms were used by relatively few. Discussions with colleagues and informal contacts at conferences were quite important for the majority of respondents. The use of some media was confined almost exclusively to certain subject specialists. The most obvious example was in geography where researchers relied very heavily upon maps. Geographers tended to make average use of informal communications. Researchers in education were fairly average users of conventional print media, except for an emphasis on the frequent use of thesis material. Because of the small number who used the newer media, only tentative conclusions can be drawn. Psychologists were the most likely to use non-print media such as video-tape and recorded sound, and sociologists radio and TV. It can be assumed that researchers in education and psychology use these media in experimentation, and that sociologists (and to a lesser extent political scientists) use them to receive information which is not available through the print media. Psychologists used conferences, and contacts with colleagues both in their own and other institutions, for the transmission of information; and they did so more frequently

than any other group of users. Some researchers in education also used conferences frequently for the transmission of information. Geographers and political scientists made less than average use of conferences. Economists behaved differently from the other respondents. They did not use the non-print media or informal communications to the same extent as other social scientists; they relied heavily upon government publications. However, they did not compensate for a less than average use of informal networks, by a greater than average use of periodicals, serials, and research reports. In fact, economists used conference proceedings and theses to a slightly less extent than did other respondents. Economists distributed their information-seeking activities fairly evenly between existing print media and informal channels.

Respondents were also asked to list the two physical forms which they found easiest or most convenient to use, and the two which they found the least convenient. It was pointed out that this question was concerned with usability and not accessibility. The most familiar physical forms were generally regarded as the easiest to use, with periodicals and monographs at the top of the list (Table 65). Collections of readings were regarded as a little more difficult to use on account of the problem of locating individual contributions. By and large, the newer media were listed as the least convenient to use. Microforms, films, other pictorial material, recorded sound and video-tape were all mentioned very frequently as being the least convenient to use. Computers, not surprisingly, provoked mixed reactions - about three quarters of the 121 respondents who mentioned computer printout found this form "convenient to use". This is quite easily explained; computers are confusing (and often irritating) to the uninitiated, but relatively simple once a certain amount of expertise has been acquired.

Respondents were asked to explain why they found any particular format difficult to use. This question was postcoded; the results are given in Table 66. The most obvious feature of this table is that no particular format was associated with any particular difficulty, and this was quite contrary to expectations.

The principal complaints were about difficulty of location and the volume of irrelevant material encountered. The only physical form which was consistently criticised was microform. Respondents found microforms difficult to scan, particularly if the index was used, and 8 per cent mentioned eyestrain. This latter difficulty is worth noting; 47 respondents mentioned this as a problem.

It should be pointed out that, strictly speaking, problems of locating material have nothing to do with the usability of any particular format - and respondents were specifically told that they were not being asked about problems of access and location. Nevertheless, 22 per cent of the total mentions of difficulties were about location and accessibility, and these responses were coded. One respondent suggested that usability was inseparable from accessibility:

> It is discovering the whereabouts and then processing reports which makes for difficulty.

The relationship between the use of types of information (e.g. historical, statistical) and the use of physical forms was investigated. Each type of material was associated with a frequent use of the physical forms periodicals, books, and to a slightly smaller extent theses and research reports. Respondents who used historical material frequently were much more likely than other respondents to use newspapers in their research; they preferred communications with colleagues in their own institution to persons outside, and made moderate use of conferences to gain historical information. Heavy users of descriptive material made frequent use of government publications, greater than average use of newspapers, and less than average use of theses. There was an indication that conferences were found to be more useful for the transmission of descriptive information than other types of information. Colleagues were judged to be an important source for descriptive information.

The use of statistical data was associated with a heavy use of computer printout. Respondents who used computer printout used it frequently, and they were more likely to require government publications, and have communication with both external and internal

colleagues, than those who did not use computer printout. Heavy users of statistical material made only average use of conferences for exchange of information.

The use of methodological material was associated with a frequent use of computer printout. Just over half of the respondents who used methodological material frequently used computer printout. This relationship perhaps reflects the greater than average use of methodological material by researchers with empirical programmes, who require methodological material for the design of experiments and computers for the analysis of data. Researchers preferred to exchange methodological material through informal contacts with colleagues, rather than at conferences.

Respondents preferred to communicate with colleagues in their own and other institutions when dealing with conceptual information, and were less inclined to find conferences useful for this type of information. A frequent use of conceptual information was associated with a greater than average use of newspapers and government publications.

There were some differences between disciplines in the frequency of use of physical forms. The heaviest users of periodicals were researchers in psychology: 82 per cent of this group often used periodicals for their research. In the case of other disciplines only about 50 per cent said that they often used periodicals, although nearly all respondents used periodicals to some extent. Psychologists were average users of monographs, and they were more likely than other researchers to make frequent use of conferences proceedings: economists and geographers made rather less use of books, whether monographs or conference proceedings. Anthropologists were very heavy users of monographs, although they made average use of periodicals. Thus, researchers in the social science (i.e. psychology) which perhaps approximates closest to the physical and biological sciences made a particularly heavy use of periodicals, whilst researchers in anthropology (where less use is made of experimental methods) tended to be book-orientated. Economists and social geographers (who also use numerical methods frequently) made less

than average use of monographs.

Government publications were used often by economists, political scientists, and researchers in economic statistics. Newspapers were used principally to obtain descriptive material, and by political scientists much more frequently than by others. Descriptive data were obtained at conferences, but statistical data rarely. The use of statistical data was associated with a greater than average use of colleagues as information sources. Irrespective of the type of material used, there was little preference for external or internal informal contacts. This situation in academic communities contrasts with that in many industrial research establishments (see Allen, 1967, 1968; Allen and Cohen, 1969; Allen and Gerstberger, 1967), where the interaction between one laboratory and another is minimal, although interactions within a given laboratory may be frequent. The interaction that does take place between laboratories is done by "gatekeepers" who are atypical of a given research community. In the present Investigation there were very few researchers who did not make use of contacts with both internal and external sources, formal and informal.

Conferences were not used by all respondents for the transmission of information, and there were one or two discipline and institutional differences. Researchers in government departments and non-university research establishments made contacts more with colleagues than did researchers in universities. There was a slight tendency for respondents from the Scottish universities to have more informal contacts with colleagues than respondents from other universities.

A frequent use of colleagues for information transfer was associated with a frequent use of conferences for this purpose. It was noticeable that researchers in institutions (e.g. non-university research establishments) that are in some sense isolated from centres of activity made greater use of both conferences and informal communications with colleagues than researchers in other institutions. For example, 96 per cent of respondents from non-university research establishments mentioned external persons, and

93 per cent mentioned internal colleagues as useful contacts. There was just a slight tendency for internal colleagues to be listed more often than persons external to own institution, but nothing to suggest that informal channels in research communities are limited to a researcher's own institution or department.

3.2.6 Methods of locating references for research (Questions 20, 21, and 24)

Respondents were asked to rate the usefulness of methods of discovering references to relevant published information required in their current research. A list of twelve methods was given, including abstracts and indexes, consultations with experts or authorities, discussions with colleagues, library catalogues, consulting librarians, and book reviews. The results are presented in Table 69.

About one quarter of all respondents never used abstracts and indexes, library catalogues, searching along library shelves, or book reviews. Slightly fewer respondents (about one sixth) never consulted experts, discussed problems with colleagues, or had discussions or correspondence with persons outside their immediate research environments. Just under half of all respondents never consulted librarians, and 35 per cent never used specialized bibliographies. References in books and periodicals were judged to be more useful than any other method: 94 per cent of respondents found this method useful and 59 per cent said it was the most useful method.

Environmental differences. There were few significant environmental differences relating to methods of discovering references. More respondents from Oxbridge, the Scottish universities and non-university research establishments found discussions with colleagues in their own institutions useful in discovering references relevant to their research than did respondents from other environments. Respondents from colleges of education found consultation with experts and librarians, use of library catalogues, and searching through library shelves in libraries other than their own, to be more useful than did other respondents. Respondents from government departments were not so likely as others to judge bibliographies and references in

books and articles, book reviews, or informal communications (e.g. consulting librarians, discussions with colleagues) useful in locating references.

The nature and size[1] of college of education libraries perhaps account partly for the different reference searching behaviour of lecturers in these institutions. These libraries tend to be small compared with university libraries and at the same time cover a wide range of material. They do not have the same facilities for specialists as do libraries in government departments. This may affect the information seeking activities of college of education lecturers in at least two ways. Firstly, other libraries may often be more useful (only 8 per cent of respondents from colleges of education did not browse in other libraries) and, secondly, personal contacts become more important. 75 per cent of college lecturers, as opposed to about 50 per cent of all respondents, consulted librarians, and this may be due to the comparatively small size of colleges of education, where personal contacts, particularly with library staff, may be easy to make.

User characteristics. There was only a small association between the status of a researcher and the methods used to discover references (Table 80). There were one or two exceptions. For example, research students used all methods of obtaining references (with the exception of consulting people external to their place of work) slightly more frequently than other researchers. Contrary to some impressions gained in the interviews, most senior researchers followed the general pattern. It appeared in the interviews that researchers of professorial and senior lecturer status were less likely than junior researchers to use formal bibliographical tools; it also appeared that their use of informal channels of communication was frequent and well developed; and that they often received, without request, more information than they could deal with. The experience of the

---

1 The Library Association Fourth Annual Survey of College of Education Libraries estimated the size of the average college library to be between 27,000 and 32,000 volumes.

Experimental Information Officer confirms this impression. The data in Table 80, however, do not support the impression. Professors and senior lecturers were just as likely as other researchers to use abstracts and indexes, library catalogues, special bibliographies, book reviews, and references in books and articles. Researchers of professorial status stood out in one respect only: two-thirds stated they found consultations with librarians of no use in locating references for research.

The variables of age, and number of years of research experience, had very little effect upon reference seeking. There was some evidence to suggest that researchers of age 51 and over found all the methods of reference searching slightly less useful than did other researchers, but there was no overall trend with age. Researchers in the 41-50 age group found all methods slightly more useful than those in the 31-40 age bracket. However, two trends were noted. Older researchers found book reviews more useful when searching for references than younger researchers (this may reflect the fact that older researchers are more likely to receive material from publishers to review). There was also a tendency for younger respondents (40 per cent of respondents fell into the 21-30 age group) more than older ones to use references in books and articles and to find them very useful. Older researchers tended to use this source almost as frequently, but when they did, found it less useful for their research than did the younger researchers. This tendency was apparent in economics, sociology, psychology and geography (Tables 71-74).

Discipline/subject of research/type of research. There were discipline differences in judged usefulness of methods of locating references, and also differences between types of research (e.g. experimental, theoretical). In Tables 75 and 76 these three variables were related. Researchers in economics who used experimental methods were more likely than economists working at the theoretical level to have discussions with

colleagues in their own institution and also with persons outside their own institutions, and much more likely to judge consulting a librarian useful but less likely to judge useful library catalogues and references in books and periodicals. In the case of education, experimentalists were more likely than theoreticians to have discussions with colleagues in their own institution and with persons elsewhere, and less likely to judge library catalogues and searching library shelves as useful.

Thus, in these two cases, experimental researchers were more likely to judge as useful informal channels of communication than theoreticians, and theoreticians were slightly more likely to judge formal channels as useful.

There was a slightly different pattern for experimental and theoretical sociologists. The experimental sociologist judged useful, locating references by abstracts and indexes, consulting experts, discussions with colleagues and persons in other institutions, and library catalogues to about the same extent as the theoretical sociologist. The experimental sociologist was a little less likely than the theoretical to judge useful the locating of references by searching library shelves in other institutions, or by the use of specialist bibliographies, but more likely to judge consult often with librarians as useful. The majority of theoretical sociologists judged specialist bibliographies least useful. Both types of sociologist found references in books and periodicals to be very useful: in fact, exactly 61 per cent of each type stated that there methods were the most useful. Thus, sociologists were slightly different from political scientists and economists, but the same pattern was apparent: experimentalists in all disciplines were more likely than theoreticians to judge informal channels of communication useful for locating references. The only researchers that departed significantly from this pattern were psychologists. The number of psychologists researching in theoretical psychology was very small, and does not allow a valid comparison with experimental psychologists. However, experimental psychologists in this aspect of reference searching can be compared with the average across all disciplines. When this is done, experimental psychologists were seen to be very active in tracing references through formal channels:

for example, finding more than average usefulness for abstracts and indexes (62 per cent of respondents said they found abstracts and indexes most useful), references in books and periodicals, and searching library shelves in other institutions.

There were a few noticeable differences in judged usefulness of methods used to locate references for research, between subjects of research (Table 79). Researchers in statistics found very little use for bibliographical tools or informal communications for literature searching. For example, 64 per cent of respondents researching in statistics made no use of abstracts or indexes, 55 per cent made no use of expert consultations, 45 per cent did not search library shelves, 82 per cent never searched library shelves in other institutions, 55 per cent did not use book reviews, and 64 per cent never consulted librarians. The picture for the other researchers is less clear cut. Economists, geographers, political scientists, and sociologists all followed the average distribution. Researchers in history found abstracts and indexes of some use, although only 6 per cent found this method particularly useful, but there is a lack of good abstracts in this field. Researchers in history found more than average usefulness in library catalogues and special bibliographies. Psychologists found some secondary bibliographical tools very useful: for example, 63 per cent stated that abstracts and indexes were very useful, but on the other hand they found library catalogues and material on library shelves in external institutions, and consultations with librarians less useful than other researchers. Anthropologists often used abstracts and indexes, although they rarely found them very useful: they were more likely than other researchers to find special bibliographies useful for locating references. Researchers in education were much more likely than others to find consultations with experts and with librarians useful for locating references.

The data in Table 79 were used as the basis of some three-way tabulations in which respondents who used unpublished material (see Question 12 and 3.2.2) were included in the tabulation of primary research interest by judged usefulness of methods of locating references for research (Table 77), and those who used published material were

included in the tabulation of primary research interest by judged usefulness of methods of locating references for research (Table 78). Although there were few differences in the judged usefulness of methods available for tracing references between published and unpublished material (there was a slight tendency for nearly all the methods to be judged more useful for finding unpublished material than published material), when these two variables were tabulated in a three-way table against discipline, one or two differences emerged (Tables 77 and 78). In the case of geography there was a very slight tendency for researchers to find specialist bibliographies, consulting librarians, library catalogues, abstracts and indexes, and consulting experts less useful for published than for unpublished material. Researchers in political science judged experts, discussions with colleagues, and consulting librarians, to be slightly less useful in tracing references to published than unpublished material. Researchers in psychology and sociology did not differentiate between published and unpublished material with respect to judged usefulness of methods of locating references, with the exception of sociologists who found discussions with persons outside their own institution and consulting librarians slightly more useful for tracing references to unpublished than published material. Researchers in history made no distinction at all between published and unpublished material when it came to tracing references.

There were also differences between disciplines related to tracing references to experimental and observational material, as opposed to material gained from interview or questionnaire surveys. Just over half of the respondents made use of experimental and observational material, and just under half made use of survey material. For researchers in all disciplines, searching library shelves, use of special bibliographies, book reviews, and references in books and periodicals were as useful in tracing material gained from experiment and observation as for tracing material gained from surveys. Abstracts and indexes, consultation with experts, and discussions with colleagues were judged to be slightly more useful for tracing material gained from experiments; and the use of library catalogues and librarians was judged to be slightly more useful for tracing material gained from surveys.

When these tendencies were broken down for each discipline differences appeared. Experts were judged by economists to be less useful in tracing survey material than experimental material. The same was true for researchers in geography, who also found formal channels less useful in tracing references to experimental material than to survey material; but they found consultations with librarians useful in tracing survey material.

For tracing references to survey material, researchers in political science were much less likely than others to find useful abstracts of library catalogues, searching library shelves (especially in institutions other than their own), consulting librarians, and special bibliographies. Survey material (supposedly the basic material of many researchers in politics) would perhaps have been gained at first hand by political scientists, in contrast to other social scientists who may rework someone else's survey data.

Researchers in psychology made especially heavy use of abstracts and indexes for tracing references to experimental material. They found experts, discussions with colleagues, library catalogues, searching library shelves, consulting librarians, using special bibliographies, and book reviews to be of more use in tracing references to survey material than to experimental material. This may be due to the fact that psychologists were more likely to use other researchers' survey data than other researchers' experimental data. The basic data for the majority of psychologists were experimental rather than survey, and a good deal of data was generated by themselves.

With the advent of data banks, and the use of secondary material in simulation programs and other forms of research, the reworking of other researchers' data is regarded as legitimate practice (at least in the social sciences). In the case of experimental material the use of other researchers' material for reanalysis is not regarded as legitimate; it is only respectable to refer to research findings without reworking the data. In this respect research in psychology approximates to that in the sciences. There are cases in which scientists have reworked other researchers' data to show the correctness or incorrectness of the mathematical calculations, but not as basic data for a subsequent study

in the absence of further data collection.

In tracing references for research the researcher in sociology made no distinction between experimental and survey materials. Sociologists were less likely to find discussions with colleagues, both in their own and other institutions, of use in tracing survey data and in tracing experimental data.

Secondary research interests and disciplines/subjects. By comparing the results of Table 79 and 80, where subject/discipline is given as both a primary and secondary research interest, it is possible to see whether the usefulness of various methods of searching for references was related to characteristics of researchers or to the nature of the literature and/or the discipline itself. The distribution of respondents across the two tables is very similar for psychology. For example, psychologists judged as most useful indexes and abstracts, judged as least useful library catalogues and consultations with librarians. Those who gave psychology as a secondary research interest followed a very similar pattern. Researchers with a primary research interest in political science and economics followed references in much the same way as those who gave these two disciplines as secondary research interests. The same was true of sociologists. Researchers in education were much more likely than other respondents to find informal channels of communication useful for obtaining references, and in particular consultations with experts and librarians. This was not the case with those who gave education as a secondary research interest.

There was little connection between judged usefulness of methods of locating references and marginal disciplines cited. For example, although psychologists judged abstracts as most useful and seldom consulted librarians, those respondents who expressed a marginal interest in psychology behaved differently. Similarly, researchers in education found informal communications more useful than did others, but respondents who had a marginal interest in education did not depart from the average.

Raw materials of research. There was little association between

judged usefulness of methods of finding references for research and use of raw material. All methods for locating references were judged useful irrespective of type of raw material (Table 102).

Types of information. When the data relating to the ways in which researchers went about finding references were tabulated against use of types of material few interesting trends emerged, and these data are not reported in detail. Judged importance, too, gave approximately the same picture.

Researchers who made heavy use of historical material were more likely than those who did not, to find library catalogues, consulting librarians, special bibliographies, and browsing, useful for the discovery of references, although they did not find great use for abstracting and indexing journals. A similar trend was apparent for heavy users of descriptive material.

Heavy users of statistical material found more usefulness in all methods for finding references (except references and bibliographies in books and articles) than those who did not use this type of material. The same was true for heavy users of methodological material. Heavy users of conceptual material were more likely than average to judge useful references in journals and monographs.

Use of physical forms (Tables 82-87). A comparison between users and non-users of periodicals is difficult and unreliable, because of the very small number of non-users (3 per cent) for each of these categories. When this number is distributed across 21 physical forms the number in each cell is very small[1]. A much more valid comparison can be made between those who use periodicals infrequently (14 per cent) and those who use them very frequently (57 per cent). Heavy users of periodicals were much more likely to judge useful abstracting/indexing journals, searching library shelves, and use book reviews in searching

---

1 In fact, the category 'not used' for periodicals is perhaps something of an error category. In a large and detailed questionnaire some mis-reading of questions will take place, and some respondents when rating frequency of usage may use scales in the reverse direction to that intended.

for references than were light users of periodicals, but they were less likely to consult librarians. The general pattern was for heavy users of periodicals to find all methods of tracing references more useful than light users, and for light users of periodicals to find relatively little use for bibliographical tools in locating references.

When the use of monographs was tabulated (Table 83) against the usefulness of methods for locating references, much the same trend was apparent. Respondents who made little use of monographs in their research tended to find little use for abstracting/indexing journals, library catalogues, and special libraries, and they did not often consider browsing in libraries or consulting librarians as useful.

In the case of other types of material (e.g. research reports, government reports, theses) the number of respondents who made no use of each type was fairly large and this allowed a comparison to be made between non-users and heavy users in two-way tables. Non-users of research reports (21 per cent of respondents) found abstracting/indexing journals, special bibliographies, and consultations with librarians of less than average usefulness when seeking references. A very similar trend was apparent for heavy users and non-users of theses and government publications.

In the case of the less frequently used material (e.g. newspapers, films, video-tape) the difference between heavy users and non-users was much less: for example, those who never used newspapers in their research (37 per cent) were different in only one way (consulting librarians) from those who did use newspapers. The majority of respondents made no use of microfilm, maps, recorded sound, video-tape, and radio and TV, in their research. About 40 per cent of respondents made use of computer printout but they were not differentiated from other users by their reference-seeking activities.

Respondents were asked how they went about locating non-book material (e.g. video-tapes, teaching machine programs). From the few answers obtained, personal contact was the largest single source of references. Of the 139 answers to this question (some respondents gave more than one method) 54 respondents said they found personal contacts useful.

The reference-seeking activities of respondents who found conferences (42 per cent) and colleagues (15 per cent) of no use in their research followed a pattern very similar to the reference-seeking activities of infrequent users of printed material: they made less use of all methods of seeking references than did heavy users of informal communications. They were especially unlikely to make use of bibliographical tools. Again, there was no evidence that inactivity in one communication channel was compensated for by high activity in another. (Tables 86 and 87).

Discipline differences: illustrative material from interviews. Further data about the information-seeking habits of social scientists were obtained from the interviews. The number of interviewees in any particular discipline was relatively small when compared with the number of respondents to the questionnaire, and therefore it has not been possible from the interview data alone to establish the representativeness and the generality of the findings. However, when the interview data are backed up with empirical data from the questionnaire survey, the typicality or otherwise of information-seeking activities is further confirmed.

One of the interviewees was a psychologist of long standing in a university department of psychology. His main interest was in the field of perception: the perception of movement and especially figural after-effects and binocular rivalry. He used Perceptual and Cognitive Abstracts for current awareness, and this abstracting service proved to be almost tailor-made for this particular type of research. He used Psychological Abstracts much less frequently than Perceptual and Cognitive Abstracts and for retrieval, rather than current awareness purposes. He was a heavy user of the informal system and had many personal contacts, although there were very few psychologists in the U.K. working in the same field. He required a good deal of information about equipment and apparatus; this was obtained, in part, from manufacturers' literature and from very specialized publications (e.g. a monograph on the design of electric circuits in the behavioural sciences). This psychologist, as was the case with others interviewed, was in close

contact with technicians. In fact, in this particular example, the monograph had been brought to the researcher's attention by a technician. The interviewee felt that much of the information he required was of a specialized nature, and although a librarian or an informal contact may be able to help with the less specialized and technical forms of information, they were judged not particularly useful (and therefore not approached) for specialized information. The interviewee made little attempt to keep up-to-date with the main body of literature in psychology. From the questionnaire data it was apparent that psychologists made little use of special bibliographies and library catalogues, and did little browsing in libraries other than those in their own institutions. Library catalogues were seen to be of little use for information about equipment, and the payoff from browsing in a number of libraries would be low.

Psychologists were in many instances atypical users of information sources, whereas economists were much closer to the other social scientists. The second example from the interviews was an economist . This economist was a fairly young researcher, with about eight years' experience in research, and had always worked in mainstream economics. He was currently engaged upon research into unemployment schemes. At the same time he was pursuing his interest in public finance. He was very articulate in his answers to questions, and gave the impression that he knew the likely sources of references very well. He made no mention of open-ended information requirements, nor did he have vague feelings that many references existed somewhere if only he could find out about them. He mentioned all the conventional methods of obtaining references; he glanced through five or six journals regularly, and found publishers' lists helpful. He did not use abstracting journals for keeping up-to-date, but occasionally used them for retrospective searching. He found them difficult to use and did so with reluctance. He mentioned that the payoff when using abstracting journals was low and that the coverage in some areas (e.g.

industrial economics) was patchy. This researcher made use of nearly all the methods of obtaining references, and did not have any particular information problem. He mentioned, as particularly useful, publications by government departments, journals in economics, and informal channels of communication. He found inter-departmental seminars and discussions with colleagues, including staff from other disciplines, useful. He was very familiar with the "cycling" method of tracing through the literature. He also had occasion to use American PhD theses and unpublished reports. He mentioned that classified lists of British PhD theses would be helpful, and avoid hit-and-miss retrieval. His interests ranged widely and he required material from sociology and law. He referred to a restriction upon the free flow of statistics from industry and government departments, but felt that this was not a problem of paramount importance. He also mentioned a problem peculiar to some of the newer universities - an absence of back issues of certain journals (including mainstream economic journals).

The third example from the interviews was a researcher in statistics. Although statisticians as a group were not included in the sample of social scientists (see section 2.6) a number replied to the questionnaire and were coded as such. It has already been noted that researchers in statistics have different information requirements from other respondents. The researcher in question was employed by a university department of economics. He was between 41 and 50 years of age, by training a mathematician, and had been in research for the past 15 years. He was interested in the application of mathematical-statistical models to economics. During interviews researchers were asked to enlarge upon sources for ideas and for motivation, and also to give a specific example of a problem in their research. It is interesting that this researcher in statistics had no ideas on the first question, and said that he rarely required information that was not fairly easily accessible. He was most unlikely to undertake a systematic search of the literature and never undertook retrospective searches. He used government official statistics, but only those readily available in publications by HMSO. He also used econometric

journals. His demands upon bibliographical sources were not at all great, although he did mention that long runs of journals were sometimes required and that microfilm and/or inter-library loan requests for journals were no substitute for the physical presence of journals in econometrics. In response to questions about the use of informal channels of communication (e.g. discussions with colleagues, correspondents, telephone conversations) this researcher said little. He rarely came across useful and/or interesting references accidentally, and engaged in very little browsing. On the other hand, he was interested in keeping informed, albeit in a fairly narrowly defined area. He was a member of the Royal Statistical Society, and frequently scanned this society's journal: he also scanned econometric journals, Central Statistical Office Newsletter, and Financial Times. He specifically mentioned that retrospective searching was of little value because his area was a fairly recent development and he was confident that he knew most of the relevant material in it. The material from the questionnaire suggested that this researcher was typical of researchers in statistics. However, one or two interesting points emerged from the interview - and ones that would be difficult to obtain from a questionnaire. The interviewee mentioned that he had a nagging feeling that important work was going on in engineering, electrical engineering, and systems control, that would be of use and interest, both from conceptual and methodological points of view. He did very little about this feeling, and certainly never made a systematic search using bibliographical resources to satisfy his felt information need. This researcher was not really satisfied with the amount of information that he had about government statistical publications. He mentioned that a guide to government statistical publications (he was unaware of existing guides) would be useful because one could then be sure that important and useful material was not missed. This particular statistician obviously had enough information to satisfy him for most of the time; and it would be very difficult to say whether or not he would be performing his functions more efficiently if he had more.

Nearly every person interviewed spontaneously mentioned the use of bibliographies contained in books and periodical articles. Although interviewees sometimes mentioned abstracting and indexing journals or browsing along library shelves as methods of obtaining references for

their research, they were often hard-pressed to give specific examples of any specialist bibliographies or bibliographical services used. The method most favoured for obtaining references was to take some of the citations in reading matter and follow them up, obtain new material, and go over the same process again. Good coverage of a given field cannot be guaranteed by this method and a biased selection of material may result, especially where the field is very large. The purpose of obtaining a representative sample is to ensure that some whole subsection of a research field and its literature is not overlooked. It is not a question of researchers requiring a representative sample of relevant literature for its own sake, but of ensuring that, over a fairly long period of time, really important research does not pass them by. Where the research field is tightly-knit, the question of representative samples of references hardly occurs, yet there are many areas in the social sciences where any one individual could not possibly assimilate, or even make note of, all relevant material, and it is here that representative selections are important.

Another example from the interviews illustrates the difficulty of providing social scientists with information services and bibliographical tools. One of the interviewees was a psychologist researching into the movement of the human eye during searching. He had been working in the area for the past ten years. He was a typical researcher in that he made moderate use of an abstracting journal and scanned half a dozen or so primary journals in psychology, including a fairly specialist one in his field - Psychophysiology. He had a number of informal contacts, which he rated highly. He mentioned that the number of publications directly relevant to his research was relatively small, and he was not therefore overwhelmed by published material although the amount of material that had to be scanned in order to produce one or two relevant references was great. This interviewee had been identified from the questionnaire as a possible follow-up, and as a result the interviewer had been able to familiarize himself with the area in which the researcher was working. It was found that the researcher did not know of two references that looked relevant to his research (a review of research on eye movements in Perceptual and Motor Skills, and an issue of the Annals of the New York Academy of Sciences devoted to various

articles on bioelectrodes). The interviewee was very interested to learn of these and made a note of them. At the time of the interview they had been in print for some ten months and traceable through the secondary sources for between six and nine months.

Conclusions. The picture obtained from the analyses of the questionnaire data is similar to the impressions gained from the interviews. The information-seeking behaviour of social scientists very often seems inadequate, unsystematic, and amateurish. It is not the place here to attempt an explanation of the infrequent use of formal methods of locating references in the social sciences; but it should be pointed out that the emphasis which researchers place upon references contained in books and articles is a very low level form of bibliographical control, and in some cases may well result in the researcher remaining ignorant of large areas of knowledge potentially relevant to his research.

It is doubtful if the information-seeking behaviour of social science researchers is influenced entirely by the nature of social science research, or the motivation and training of researchers: the formal system may play a large part. Bibliographic tools, for example, could perhaps be made more attractive to use, the subjective "payoff" for users could be increased, and the coverage of the primary literature could be improved and in some cases perhaps made more specific. A comprehensive quantitative description of the social science literature is not available. However, while the tools which the social science researcher has at his disposal may be inadequate, the fact remains that social scientists could, by the use of existing services, cover a good deal more of the references than they do. Where services are very bad (for example, difficult to obtain, time consuming to use, or unpleasant or difficult to use) the practitioner can make a good case for ignoring them, even if the knowledge which he himself regards as desirable suffers as a consequence; but the researcher can make no such case.

Changes in the formal information system (for example, a rationalisation of abstracting tools) are certainly required, although this alone would perhaps have little effect upon the information-seeking activities of social scientists. In science modifications in

information services and bibliographical tools have gone only a small way to modifying researchers' information-seeking activities. It would, in any case, be foolish to proliferate information systems without a fair probability that they would be used, and used in a manner that would provide the researcher with more relevant information than he has at present. Perhaps future research should look at the motivation of researchers, and at fundamental questions about the nature of social science research and its literature.

As regards the informal system, little can be said. It was apparent time and time again, however, that library staff were not often consulted by the majority of respondents - in spite of the fact that they are usually the very people who could help to solve the usual information problem. There may be many reasons for this, not least the size and anonymity of many university libraries, and the fact that many academics feel that only a fellow specialist can understand their specialisms well enough to be of use. Two comments made in response to the questionnaire may shed some light on this apparent disregard of librarians:

> We need a more determined 'public-relations' outlook by librarians, so that their particular skills should be more widely known.
>
> Librarians are friendly and helpful but busy - I feel obliged to bother them as little as possible. They are ... so far behind in their routine work ... The profession needs restructuring to release experienced librarians from clerical tasks.

3.2.7 Use of personal files (Question number 23)

The majority of respondents (88 per cent) used some form of personal file. The most popular method was to write references on blank index-cards and to file them by author or subject - 58 per cent used this method. 12 per cent used handwritten sheets. Less than 2 per cent used coordinate indexing. Differences in use of files between age groups were small (see Table 91). The use of files was related to status of researcher. There was a tendency for junior (and accordingly younger) rather than more senior researchers to keep files: 18 per cent of professors did not keep a file, while only 8 per cent of the

junior group did not keep one. Differences between environments were also slight; 21 per cent of those in government and industry did not state what sort of file they used, but merely said they kept one.

3.2.8 Use of photocopies (Question number 22)

Respondents were asked if they made photocopies of papers, tables, or articles of interest to their current research, and to indicate the frequency with which they did so.

Only 13 per cent of respondents said that they rarely or never had photocopies made, 39 per cent did so frequently, and 47 per cent occasionally. There was a significant relationship between the use of photocopies and age (Table 88); younger respondents were much more likely to take photocopies than older respondents (Table 88). Photocopies were not taken more often at the new universities than at the established universities. Considering the inadequate back runs of journals often found in new university libraries (interviewees in the new universities invariably mentioned this as a problem) this finding is a little surprising. Social scientists in government departments were more likely to have photocopies taken than were researchers in other environments: 70 per cent did so frequently, and only 3 per cent did so rarely. College of education lecturers had photocopies taken infrequently.

The data gained from interviews gave a possible explanation why government social scientists were more likely than other social scientists to take photocopies. Library and information systems in government departments were seen to be very efficient, and while researchers in government departments did not always have the same ease of physical access to their libraries as did researchers in universities, they were usually able, as a matter of routine, to obtain photocopies of those articles judged to be relevant. They often picked up references after scanning weekly listings of articles or circulated contents pages of journals. In fact, social scientists in government departments were encouraged to make use of photocopies of articles and rarely had to account for the cost. In contrast, many university researchers complained that they either had to pay for photocopies themselves, or that

departments restricted the number that could be made.

3.2.9 Use of bibliographical tools (Question 25)

Abstracting and indexing periodicals are the major bibliographical tools, and they play a major part in bibliographical control. These secondary tools, taken together with the primary literature which they control, constitute a large part of the formal communication system in the social sciences. Their use and design are therefore a matter of great importance for future planning. In the present Investigation the use made of these tools, user reactions to them, and suggestions for improvements, were studied with the intention of picking up clues about the function they have in bibliographic control.

Nearly every social science researcher used at least one abstracting or indexing journal. The majority used only one (65 per cent), 16 per cent used two, 11 per cent used three, and 1 per cent used as many as seven. During coding, and also during interviews it became clear that some social scientists did not know what an abstracting or indexing journal was. This finding was a little confusing at first, because nearly every respondent to the questionnaire used at least one secondary tool. It must be concluded that a few researchers who were making use of such tools, were unaware that the tools could be so categorized.

The total number of abstracting and indexing journals used was largely unrelated to age, environment, status, length of experience in research, etc. and therefore these data are not reported. There was one notable exception. College of education lecturers were more likely than other respondents to use only one secondary journal; 84 per cent of them did so compared with 65 per cent of the whole sample. College of education users mentioned British Education Index and Sociology of Education Abstracts more often than any other secondary tool. A wide range of other secondary journals were mentioned by college of education lecturers, but none of them very frequently. This finding provides further evidence to show that college of education lecturers have very different information requirements, although at a superficial level their knowledge of the formal system is very similar to that of the university researcher.

The type of information used in research was largely unrelated to the number of abstracting and indexing journals consulted. Thus, respondents who made frequent use of historical material used, on average, the same number of secondary sources as those who made frequent use of statistical, conceptual, and methodological types of information. Respondents who did not use statistical, methodological or conceptual materials were more likely to use only one secondary tool than those who did make use of these materials. 65 per cent of the whole sample used only one secondary journal, whereas 75 per cent of those who did not use statistical material, 80 per cent of those who did not use methodological, and 86 per cent of those who did not use conceptual material, used only one secondary journal. This pattern became very familiar during the analyses: respondents who made little or no use of one part of the formal or informal information systems were less likely to interact with any other part of these systems.

Use of specific abstracting and indexing services. No list of abstracting and indexing journals was given in the questionnaire, but respondents were asked to recall the names of journals used. It was hoped in this way to produce a more reliable result, and also to distinguish genuine secondary tools from other journals mentioned - as stated above, some respondents had a hazy view of what an abstracting or indexing journal was. Some respondents may have used tools they could not remember the names of, but this may be cancelled out by some who remembered names but had never actually used them. During coding a number of the more important social science secondary tools were given their own code: and the rest were put into a single category.

Aslib Index to Theses 25 respondents mentioned this tool. The heaviest users came from colleges of technology, schools, and the new universities. The highest proportion of users (29 per cent) were researchers in education.

British Education Index This was referred to by 29 respondents. The highest proportion of users came from redbrick universities and colleges of education. 82 per cent of the users were researchers in education. This is one of the two major bibliographical tools in education and its low rate of use is rather surprising, only 10 per cent of researchers

in education mentioning it.

Current Sociology 17 respondents mentioned this journal; 12 were sociologists, and 3 political scientists. While it is not an abstracting or indexing journal (a fact which may have resulted in an artificially low number of mentions) it was decided to code it simply because it received a fair number of mentions, and because it contains review articles.

Dissertation Abstracts 23 respondents used Dissertation Abstracts. Educationalists (33 per cent) and political scientists (21 per cent) were the heaviest users.

Economic Abstracts This was little used. Only 18 respondents used it and the majority of these were economists or economic historians.

Education Index Like its British counterpart, the Education Index was little used; only 21 respondents used it, all of whom were educationalists of one kind or another.

Geographical Abstracts was fairly heavily used when compared with most other services. 55 respondents used it. 49 of the 55 users were geographers. This represents about half of the geographers that responded.

Index to Economic Journals This, like Economic Abstracts, was little used, only 35 respondents consulting it, nearly all of whom were economists. But again, as this is not really an abstracting or indexing journal, the figure of 35 users may be artificially low.

International Bibliography of the Social Sciences None of the sections in this series was used very much. 5 respondents used the anthropology section, 10 used the economics section, 11 the political science section, and 9 the sociology section; this did not surprise us, as it is hopelessly out-of-date.

International Political Science Abstracts 15 users consulted this, and 14 of them were political scientists.

Journal of Economic Abstracts This was the most used of the major bibliographical aids in economics. 61 respondents used it. The majority of users (87 per cent) were economists.

Psychological Abstracts 75 per cent of respondents with a primary research interest in psychology used Psychological Abstracts: 21 educational psychologists and 12 sociologists also used this journal. There was a total of 133 users, the highest number of mentions for any service.

Index to Current Periodicals received by the Library of the Royal Anthropological Institute No one used this service, in spite of the fact that 26 respondents were researching primarily in anthropology, and a further 7 were working in fields related to

anthropology.

Science Citation Index 7 respondents used this service; 6 were psychologists. It is probable that this service would have been used more heavily, especially amongst psychologists, had it been more widely available in British universities.

Social Science and Humanities Index This was used by 22 respondents. The largest group of users (8) were political scientists.

Sociological Abstracts 107 respondents consulted this journal; 5 respondents found difficulties with it, and 3 said that they would use it were it available locally; 4 of the users did not have access to a copy locally. Just over half the users were sociologists; another third were working either in educational sociology, social psychology, or political sociology. But the service was not used as much as it could be: 173 respondents were working in sociology, and a further 199 in fields related to sociology, so that of the respondents who might be expected to use the service, only a third did so.

Sociology of Education Abstracts 25 respondents used this service. 20 of them were working in sociology of education, and these represented half of the respondents who were working either as sociologists with an interest in education or educationalists with an interest in sociology. SEA was used rather more heavily by its potential users than was Sociological Abstracts by its potential users. Sociology of education is still a relatively small field, and SEA is a comparatively recent service, so that a high number of references to SEA at the time when the questionnaire was circulated was not to be expected.

It is apparent from these figures that the major abstracting and indexing services were not being used by anything like their total potential clientèle. The following tabular summary is an attempt to indicate the proportion of potential users of each service who actually said that they used it. This table provides only rough-and-ready estimates for each service, and should be treated with caution; the potential market (except in the case of Sociology of Education Abstracts) is based on the number of respondents with a primary or secondary research interest in the appropriate discipline. In the case of Sociology of Education Abstracts all respondents with a primary interest in sociology and a secondary interest in education as well as respondents with a primary interest in education and a secondary interest in sociology were included in the first column of the following table.

ACTUAL USE[1] AS A PERCENTAGE OF POTENTIAL USE
OF SECONDARY TOOLS

Service	No. of actual users	No. of potential users	Actual use as a % of potential use
Aslib Index	25	?	-
Brit. Educ. Index	29	243	12
Current Sociology	17	408	4
Dissertation Abs.	23	?	-
Economic Abs.	18	348	5
Education Index	21	243	9
Geographical Abs.	55	103	53
Index to Econ. Jnls.	35	348	10
IBSS (Anth)	5	33	15
IBSS (Econ)	10	348	3
IBSS (Pol)	11	186	6
IBSS (Soc)	9	408	2
Int. Pol. Sc. Abs.	15	186	8
J. Econ. Abs.	61	348	18
Psychological Abs.	133	225	59
Science Citation Index	7	?	-
Social Science & Humanities Index	22	?	-
Sociological Abs.	107	408	26
Sociology of Educ. Abs.	25	40	63

[1] Some users of several tools may be outside the disciplines most immediately concerned (e.g. 5 users of British Education Index were not researchers in education) and this will inflate the percentages in the final column.

It is noted that Geographical Abstracts and Psychological Abstracts both attracted about half their potential readership. The figures were even higher if only primary research interest was taken into account: 55 per cent of those with a primary interest in geography, and 75 per cent of those with a primary interest in psychology used the two services respectively. Sociological Abstracts, on the other hand, was mentioned by only a quarter of its potential readership. In the short time since it was first published Sociology of Education Abstracts has built up a respectable following. SEA does seem to be filling a real need.

Value of abstracts and titles in assessing relevance (Question 26). Respondents were asked to assess the value of abstracts as opposed to simple author-and-title entries when assessing the relevance of references for research: respondents could indicate that abstracts were about as satisfactory as author-and-title entries, rather more satisfactory, or much more satisfactory. This question aimed only at subjective impressions; the only scientific way to judge relative value of titles as opposed to abstracts is by a separate set of controlled experiments, and this would have been outside the scope of the Investigation; but the fact that answers to the question are subjective does not invalidate our approach. Given that very few respondents have had any training in the use of bibliographical tools, their approach to them (as is evident throughout this study) is in itself unsystematic and impressionistic; the subjective feeling of difficulty or ease of use invoked by a specific tool may have a considerable effect on the user, even though his opinion might be changed by training and experience.

One hundred and forty-six respondents (9 per cent) indicated that abstracts and titles were of roughly equal value, 40 per cent found abstracts rather better, and 41 per cent found them considerably better. 7 respondents wrote into the questionnaire (no category was provided for this response) that abstracts were worse than titles, though it is hard to see how this is possible.

Responses to this question were tabulated against age, status and length of experience, but no significant relationships were indicated when chi-square tests were applied. Tabulations against frequency of use of different types of information, and against judged importance of information types, also yielded negative results, with one exception: respondents who used abstracts and indexes heavily tended to value abstracts higher than titles in assessing relevance. Fifty per cent of those respondents who rated abstracting and indexing journals as very useful for locating references, regarded abstracts as being considerably better than titles in assessing relevance, whereas only 29 per cent of those who did not use abstracting and indexing journals for locating references made the same judgement.

There were few disciplinary differences relating to the judged usefulness of abstracts as opposed to title entries. Only anthropology and psychology departed from the average pattern (Table 104). Many more researchers in psychology than in any other discipline found abstracts to be considerably better than author/title entries when assessing relevance of an article. It has already been noted that psychologists made more use of abstracting and indexing journals than researchers in other fields. Psychology is probably better served with abstracting journals than the other social sciences, and it may be that the relevance of references and articles required by psychologists can be assessed through the use of abstracts much more easily than can the material used by other social scientists. The data suggest, for example, that researchers in anthropology found abstracts much less useful in assessing relevance than did other social scientists (too much weight cannot be given to this finding because only 17 researchers in anthropology answered this question).

Taken across all respondents, the relationship between judgements of abstracts as being of equal value, rather better, or considerably better than author/title entries in assessing relevance was in the ratio 1:2:2. When these judgements were broken down against the type of research there were one or two differences (Table 105). Where research was experimental or methodological, researchers were more likely to rate abstracts higher than titles when assessing relevance; and where research was historical, respondents were much less likely than average to judge abstracts considerably better than titles.

Searching abstracts and indexes for subject entries (Question 27). Respondents were asked if they had difficulty in locating subject entries related to their research when using abstracting and indexing journals; and, where difficulties occurred, to indicate whether they were due to the problem of putting into convenient terms the subjects or concepts in which they were interested; or to the difficulty in finding the terms the indexer had used for these subjects or concepts; or both.

Forty-nine per cent of respondents experienced no difficulty of this nature; 12 per cent found difficulty in putting subjects or concepts into appropriate terms for entry into listing indexes, 22 per cent had difficulty with the terminology used in indexing and abstracting journals.

and 17 per cent experiences both these difficulties (Table 108). This confirms the view that the social sciences present considerable problems of terminology in the design of secondary tools.

When the answers to this question were tabulated against the methods for locating references, there was a relationship between usefulness of different methods of locating references and problems associated with the use of index entries in abstracting and indexing journals. Respondents who found consulting experts or authorities, discussions or correspondence with persons outside their own institution, or consultations with librarians (i.e. a heavy use of informal channels for locating references) useful for locating references tended to find more problems in using index entries in abstracting and indexing journals than those repondents who did not find these methods useful. Nearly all of this group said that their problem was one of putting into appropriate terms the subjects or concepts in which they were interested (Table 108).

It has already been said that there were differences between disciplines in the number of problems experienced in using index entries: more respondents in sociology than in any other discipline stated that they experienced difficulty in locating subject entries when using abstracting and indexing journals.

Irrespective of subject of research, more difficulties were experienced by full-time researchers than by respondents who combined research with teaching (Tables 108 and 109).

Difficulties in the use of abstracts and indexes. Respondents were asked to state any difficulties they had experienced in the use of abstracting or indexing services. There were only 55 replies to this question, which means that very few generalisations can be made. The two most common problems were interconnected: complaints about the quality, and sometimes absence, of indexes in abstracting journals; and complaints that the layout of abstracting and indexing journals was poor.

An accurate assessment of difficulty of use presents great problems: people tend to use what they have, and to be unaware of its

deficiencies in the sense that they do not have a clear view of what alternatives are possible. Subjective impressions, such as were asked for, can therefore only give a rough indication of likely difficulties as seen by respondents - the real difficulties may lie much deeper.

Library catalogues and printed bibliographies (Question 30a). Respondents were asked to name library catalogues and printed bibliographies they had used in the course of their current research; and to give an approximate indication of how many bibliographies they had used where they could not recall the title. In coding these answers a distinction was observed between local library catalogues (ones that the researcher had to consult at the library concerned) and printed catalogues such as those of the British Museum or the Library of Congress, which are fairly widely available. It was felt that the latter might emerge as an important research tool in many instances.

Of the 899 respondents who answered this question, 39 per cent did not use catalogues or bibliographies at all for their research. The majority of respondents who did use them consulted between 1 and 4. A small group of respondents, 5 per cent, relied heavily upon catalogues and bibliographies, using 10 or more (Table 111).

The types of catalogues and bibliographies mentioned by respondents are shown in detail in Table 112. Sixty-nine per cent of the 547 respondents who gave an affirmative answer to the question specifically mentioned local catalogues. Special bibliographies relating to a particular discipline, or field of study within a discipline, were used by 41 per cent of respondents (Table 112), and these were more likely to be consulted in groups rather than singly. General bibliographies (including bibliographies containing material largely outside a researcher's primary research interest) were used infrequently.

As was expected, respondents who rated catalogues and bibliographies highly as a means of locating references for research made more use of them than respondents who rated them lowly (Tables 113 and 114). Respondents who used two or more catalogues found them more useful than those who used only one. The relationship between judged usefulness of bibliographies and frequency of use was not at all clear:

the number of users in this tabulation was small, but the trend was similar, and this was especially the case with those who used more than one bibliography.

From the three-way tables there was some evidence that researchers whose interests spread across a number of disciplines used more bibliographies and catalogues than researchers whose interests were confined to a single discipline (Table 115). Those whose primary and secondary research interests were in economics were less likely to use these bibliographical tools than geographers, sociologists, and economic historians. For example, 55 per cent of respondents with primary and secondary interests in economics made no use of these bibliographical tools, as opposed to 32 per cent of geographers and 7 per cent of economic historians. A similar situation was found when other disciplines were related. Respondents with a primary research interest in education and a secondary research interest in psychology were more likely to make use of these bibliographical tools, and use more of them, than were mainstream psychologists. Psychologists did not use library catalogues and printed bibliographies more often than other social scientists. This contrasts with their more frequent than average use of abstracting journals. Psychologists with a secondary research interest in education were no more likely to make use of library catalogues and printed bibliographies than researchers with a primary interest in education.

Psychologists with a secondary research interest in sociology made less use of library catalogues and printed bibliographies than did researchers with primary and secondary research interests in sociology. In fact, the observed difference in the use of these bibliographical tools between researchers whose research interests were limited to a single discipline, and those with cross-disciplinary interests, was not true for sociology as a secondary research interest. Mainstream sociologists made greater use of these bibliographical tools than anthropologists, researchers in education, political scientists, psychologists, and statisticians giving sociology as a secondary research interest. Economists proved to be the exception: those that had a secondary research interest in sociology were just as likely to use these bibliographical tools as were sociologists with a single research interest.

Researchers with a secondary research interest in history were much more likely to use library catalogues and printed bibliographies than researchers with a secondary research interest in any other discipline. These researchers have already been identified as economic or social historians. There were 24 respondents who had a primary research interest in economics and a secondary research interest in history, and of these only 17 per cent said that they never used library catalogues and printed bibliographies. There were 14 respondents with a primary research interest in sociology and a seconday research interest in history; 7 per cent of this group did not use these bibliographical tools.

Some respondents suggested that more cross-disciplinary bibliographies were needed; and there were complaints about the amount of detail in library catalogues. In addition to the question on use of catalogues and bibliographies, respondents were also asked about the usefulness and limitations of these tools. About half of those who answered this question found the arrangement and comprehensiveness of bibliographies and catalogues satisfactory; and only about one fifth found them poor in either respect (Tables 116 and 117). A number of respondents said that they were not detailed enough; there were a number of general criticisms. In general, catalogues were criticised more than bibliographies. About half of the respondents to the question were satisfied with the arrangement of catalogues but a third of the total felt that they were unsatisfactory. Only 4 per cent of the total thought that there was enough detail in catalogues, and 47 per cent that there was not enough; 48 per cent had no opinion. There were a variety of other criticisms: 11 per cent of respondents said that catalogues were not sufficiently cross-referenced; 7 per cent found them difficult when searching for conceptual material; and 7 per cent said standardization between one library and another was needed.

In conclusion it seems that there is a fairly high degree of dissatisfaction with both bibliographies and catalogues, although catalogues were criticised more than bibliographies.

Potential value of a social science citation index. Respondents were asked to indicate the usefulness to their research of a social science citation index. Over half of the respondents indicated that such an index would be very useful, and only 5 per cent indicated that it would be of no use at all (Table 107). No strong associations emerged between the answers to this question and other variables.

Answers to this question must be treated cautiously; it is exceedingly difficult to describe a citation index to someone who has never handled one, and the only way to obtain reliable data on the value of a social science citation index would be by practical experiment. The high rate of approval for such a service might be exaggerated; experience shows almost always that people greet any projected service with enthusiasm, and become less enthusiastic when they are faced with using it.

Comment and conclusions. Nearly all respondents made some use of at least one abstracting journal. Abstracting journals were preferred to indexing journals; this agrees with the finding that abstracts were preferred to titles by 80 per cent of respondents for assessing relevance.

Researchers certainly use fewer bibliographical tools than would be helpful for them, and do not make the systematic and frequent use of abstracting tools required to ensure good coverage of their topic, and at the same time to minimise the possibility of missing important material. The information profession sometimes assumes that researchers want to, and can, work in a systematic way in dealing with bibliographical material and that the bibliographical system is about the only system, or at least the most important system, for the transfer of information. In view of the overwhelming evidence that social scientists do not perform in this way, such assumptions (sometimes followed by exhortations) should be avoided. User education may go a long way to alerting researchers to potentially useful bibliographical tools and ways of using them; but it is doubtful if it could do more.

The user is handicapped at present by the large number of abstracting services currently available - with a good deal of overlap in some areas and large gaps in others. In reply to the invitation to suggest general improvements to the system, one respondent said:

Anything you like, but NOT yet another abstract. There is a case for rationalisation of bibliographical tools rather than proliferation.

3.2.10 Use of, and requirements for, monographs

Number owned by researchers (Question 32). Respondents were asked to indicate approximately how many volumes they owned which were directly related to their current research. Answers to this question were impressionistic, and should be treated with caution; it is difficult to define "relevance" in this context and a definition of "volume" was not given in the questionnaire. Nevertheless, the answer probably represents a useful rough estimate of the size of personal collections.

Thirty-seven per cent of respondents owned less than 10 volumes, and just under one third owned over 25 volumes (Table 118). There was a fairly complex relationship between the number of volumes owned, age of owner, length of research experience, and research topic.

As expected, older researchers owned more volumes than younger researchers - at least in some disciplines (Table 119). Older respondents researching in economics owned more volumes than younger ones: for example, 19 per cent of researchers in economics in the 41-50 age group owned more than 100 volumes, whereas only 4 per cent did so in the 21-30 age range. However, there was no straightforward relationship between number of volumes owned and age group in economics, because while older researchers were more likely to own over 100 volumes than younger researchers, older researchers were just as likely to own less than 10 volumes as were the younger researchers. About half of the respondents in economics owned fewer than 10 volumes.

In education the same tendency was not apparent: only 4 per cent of respondents in education owned 100 or more volumes and the number owned was unrelated to age. Forty-one per cent of researchers in education owned less than 10 volumes, 31 per cent owned between 11 and 25, and 20 per cent owned between 26 and 50 volumes.

Researchers in geography were much more likely to own many volumes than researchers in any of the other disciplines: 22 per cent of

respondents owned more than 50 volumes and 12 per cent more than 100. Older researchers in geography had larger collections than younger ones.

In the case of political science the relationships were not clear-cut. Twenty-seven per cent of respondents owned less than 10 volumes and 14 per cent owned more than 100. The other political scientists were fairly equally distributed across the other categories.

The number of volumes owned by psychologists followed a pattern similar to the one in economics. Forty-five per cent of researchers in psychology owned less than 10 volumes and only 6 per cent owned more than 100. The age of psychologists was largely unrelated to number of volumes owned. In sociology, 67 per cent of respondents owned less than 25 volumes, and only 7 per cent owned more than 100. There was no consistent trend with age. Researchers whose subject was history owned, on average, more volumes than did other researchers. Twenty-nine per cent owned fewer than 10 volumes, 26 per cent owned between 11 and 25, and 21 per cent owned between 26 and 50. Twelve per cent owned more than 100.

The number of volumes owned was largely unrelated to environment, except in the case of researchers in independent research establishments where 73 per cent of respondents owned fewer than 10 volumes (Table 120). It is possible that independent research establishments, because of their relative isolation, maintain a collection of documents that are closely related to the research of the institution, are close at hand, and can be used in individual rooms and taken home, a situation not so common in many larger research institutions, including university libraries and libraries in government departments. Also the specialized, short-term nature of the research in some independent research establishments would tell against the building up of personal collections. Researchers unattached to an institution owned more volumes connected with their research than researchers attached to an institution. About one fifth of the independent researchers owned more than 100 volumes.

There was a slight tendency for researchers who owned less than 10 volumes to make less use of theses and dissertations in obtaining

information than researchers who owned more than 10 volumes, and they were also less likely to use conferences and colleagues for the transfer of information.

The differences between respondents who owned less than 10 volumes and those who owned more are small, but they do confirm previous analyses in suggesting a relationship between information seeking and using behaviour and personality differences. It would appear from the data in Table 124 that respondents who had the smallest personal collections were less likely than those who had larger collections to use formal channels for information transfer. Also respondents who made use of only one library for their research were less likely than respondents who made use of two or more libraries to use theses, conference proceedings, collections of readings, and government publications; and less likely to use them frequently. This was especially so for theses and dissertations, newspapers, and government publications.

Indexes in books (Question 29). Respondents were asked if they had experienced difficulty or inconvenience in using books because of inadequate indexing; and to indicate how indexing standards might be improved. These data are reported in Table 110.

Forty per cent of respondents had experienced no difficulty: 23 per cent reported that indexes were often too small to give adequate coverage of the contents, but this was an occasional handicap only for a further 25 per cent of respondents. Fifteen per cent of respondents mentioned that unsuitable terms and poor layout were problems experienced frequently and 25 per cent said that these were experienced occasionally.

The suggestions made by the respondents for improving indexes were not worth analysing in detail: very few respondents answered this question and there was a good deal of variation between those that did. The most popular suggestion, made by 122 respondents, was

for bigger and more comprehensive indexes. Twenty-three respondents said that indexes would be more useful if they were prepared by professional indexers instead of relying upon authors doing their own indexing; on the other hand, 24 said that indexes would be far more useful if authors prepared their own indexes instead of leaving it to non-specialist professionals! There was some disagreement about cross-referencing: 46 respondents wanted to see more cross-referencing, and 5 said that there should be less.

The data suggest that there is an appreciable amount of discontent about current methods and standards of indexing, but the answers do not provide clear evidence for remedial action, except insofar as there is general agreement that in most books the index is too short.

Use of books in conjunction with one another and consecutively (Question 37). Respondents were about equally divided between using books in conjunction with one another and consecutively.

There were one or two differences between subject specialists (Table 149), and especially for geography, psychology and statistics, where respondents said that they were more likely to use books consecutively rather than in conjunction with one another. Respondents in anthropology and sociology were more likely than other respondents to use books in conjunction with one another. This same pattern was apparent when anthropology was given as a secondary interest (Table 150). Geography and psychology as secondary interests were also associated with a greater than average use of books consecutively.

It is evident from this data that researchers in the "harder" social sciences were more likely to use books one at a time than were researchers in the "softer" disciplines. It should be noted that the relevance of this question was to libraries rather than books as such, because it involves the issue of open v. closed access, and provision of microfilms (microfilms can hardly be used in conjunction with one another).

3.2.11 Use of libraries

Number used (Question 33). Respondents were asked to list, in order of usefulness, the libraries that they had used for current research; and also to indicate whether they had used them for borrowing or consultation. From this data it was possible, among other things, to derive the total number of libraries used in research and to relate it to other variables. The libraries were classified by type (as can be seen from the relevant table-headings); some of the categories adopted require amplification.[1]

Only 3 per cent of respondents never used a library for research purposes, 16 per cent used 1 library, 21 per cent 2 libraries, and as many as 11 per cent of respondents used 6 or more libraries. There was a significant tendency (Table 126) for older researchers to use no libraries at all. For example, 8 per cent of respondents of age 51 or over did not use libraries, only 2 per cent of respondents in the 21-30 age group did not use libraries for research. Research students made more use of libraries than other researchers, and researchers in full-time research made greater use of libraries than respondents who combined teaching with research. Respondents of professorial status tended to use only one or two libraries, whereas senior lecturers, readers, and lecturers often used three or four libraries.

---

1 Coding of libraries:

Own university library: Where a user was registered for a higher degree at one institution but worked in another, the latter was coded as his main library. London College libraries were coded as university libraries.

Departmental library: Any library in user's own university at departmental or faculty level.

Local library: Whether non-university libraries were coded under this heading or under the heading "other" depended on the distance user had to travel.

Special libraries: These included (as far as university repondents were concerned) government libraries and special institute libraries.

National Lending Library for Science and Technology: This was only coded if it had been visited by the user.

University of London Senate House Library: Specially coded to avoid confusion with London College libraries.

The same picture was seen in the relationship between the number of libraries used and number of years' experience in research (Table 127). Those with a long experience (going back to the 1921-1940 period) often did not use the library at all, and when they did they were more inclined to use one library only than were those with less experience. Those with only one or two years' research experience rarely stated that libraries were not used at all, and they were more likely to use 3 or even 4 libraries than researchers of long standing.

Respondents from government departments were much more likely to use only one or two libraries than were respondents from Oxbridge, who were more likely to use several; four-fifths of respondents from Oxbridge used three or more libraries. These data are given in Table 128. Between 1 and 13 per cent of respondents from other types of institution said that they used no libraries at all, and the number of libraries used by those that did was distributed according to the average pattern. Non-users of libraries came predominantly from technological universities.

Some studies have shown a relationship between the distance between the place of work or residence and the library, and frequency of library use[1]. The fact that respondents from Oxbridge and government departments (where library facilities are close at hand) used libraries more often than respondents from other institutions also points in this direction. Further, government employees are likely to have close at hand only one library or library source, whereas researchers at Oxbridge are likely to have easy access to a number of libraries. It may not be just a question of distance, because the coverage (for example, of recent material) of many of the Oxbridge libraries probably makes it necessary to use more than one.

The Experimental Information Officer at Bath University has observed similar behaviour by economists and sociologists, who explained the infrequency of their visits to the relevant library in terms of distance (a ten minute walk from their rooms). More frequent visits were intended when the collection was moved into the new central library close by.

---

[1] For example, Kenney (1966)

The relationship between the number of libraries used and subject of primary research interest is given in Table 129. Researchers in statistics stood apart from other researchers; and this supports other findings about researchers in statistics. Nearly half of the researchers in statistics used only one library, and none of them used more than three libraries. After the statisticians, psychologists made the lowest use of libraries. Historians, political scientists, and geographers tended to use more libraries than average. Researchers in anthropology, economics, education, and sociology were all about average in the number of libraries they used. Very few respondents from any discipline said that they never used a library.

In most disciplines those pursuing full-time research used about the same number of libraries as those combining research with teaching. This was not the case in geography and psychology (Table 133). In the main, geographers used more libraries than did the others, but it was the full-time researchers in geography who did this, rather than all geographers. For example, 32 per cent of full-time researchers in geography used six or more libraries for their research, whereas only 16 per cent of those who combined research with teaching used this number. There was a similar pattern in psychology. For example, 23 per cent of respondents with a primary research interest in psychology used only one library; but those in full-time research were more likely to use 3 or more libraries than were those who combined teaching with research. This tendency was not apparent in the case of researchers in economics, education, political science or sociology (the numbers involved in the three-way tables for anthropology, history and statistics were small and were not therefore included in Table 133). In fact, in the case of economics, there is a slight tendency in the reverse direction: those engaged in full-time research were less likely to make use of more than one library than those who combined teaching with research. In the case of education and sociology the full-time researchers used on average the same number of libraries as those who combined teaching with research. The data for respondents with a primary interest in political science followed no clear cut pattern, although there was a tendency for the full-time researchers to make use of five (or more) libraries more often than

those who combined teaching with research.

Data about marginal disciplines are given in Table 130. Respondents who did not give marginal disciplines relevant to their research were more likely to use only one library than those who listed marginal disciplines.

The type of information used in research (e.g. historical, descriptive, statistical, methodological, or conceptual) was largely unrelated to the number of libraries used (Table 131). There was a slight tendency for those who used each type of material a good deal to use more than one library; and for those who did not use any given type of material very much to use one library only. In Table 132 the importance of various types of material is tabulated against the number of libraries used. The number of libraries used was unrelated to judged importance of descriptive, statistical, methodological, and conceptual materials. Only researchers who found historical data very important for research were more likely than the rest to make use of a large number of libraries.

When the number of libraries used was tabulated against the use of physical forms of material for research, few significant relationships emerged, at least for the most frequently used forms of material (e.g. books, periodicals, and research reports). Respondents[1] who never used periodicals or books were much more likely to use only one library or no library at all in their research than were respondents who used periodicals and books. This was partly the case with those who made no use of theses and government publications; they tended to use only one library more often than other researchers. Conversely, those who made frequent use of film material tended to use either one library or none at all. The number of researchers who used unconventional media for communications (e.g. tape recordings, video-tape) was very small and a breakdown by number of libraries used was not attempted.

---

1 The numbers involved are, of course, very small. Only 11 respondents never used periodicals and only 20 never used monographs.

The frequency with which the informal channels of communication (e.g. conferences, colleagues) were used, showed little relationship to number of libraries used.

Those who judged abstracts and indexes, consultations with experts, discussions with persons outside their immediate institutions, library catalogues, librarians, special bibliographies, and references in books and articles to be of little use in locating references, tended to use only one library for their research more often than did respondents who found these bibliographical tools and services to be of some use (Table 134). Researchers who found discussions with colleagues and searching the library shelves in their own institutions to be of no value did not differ in the number of libraries used from those who found these bibliographical tools and information services of some use.

There was a significant and straightforward relationship between number of libraries used and the number of volumes owned by respondents (Table 135). Respondents who owned a large number of volumes tended to use more libraries than respondents who owned a smaller number of volumes. It appeared, therefore, that those researchers who were information-conscious and active in one area were also active in others. It is not so much a question of one or the other information activity, but of many or few.

Personal convenience was an important factor determining use of libraries. Clients of the Experimental Information Officer at Bath University have stated that deficiencies in library collections are factors encouraging personal collections. One client pointed out that there was a premium on time; and borrowing from the library was marginally more time consuming than building up a large personal collection.

Usefulness of different types of library. In addition to listing the number of libraries used in research, respondents were also asked to list, in order of usefulness, types of libraries used in order of usefulness. Fifty-six per cent of respondents considered the main library in their own institution to be the most useful (Table 136). Other respondents were distributed widely in their choice, across

departmental libraries, local lending library, British Museum, London University (Senate House), special and other libraries. Only three respondents gave the National Lending Library for Science and Technology as the most useful library for their research.

When the library considered to be the most useful was related to some of the other variables, especially discipline, the preference for one type of library rather than another was seen to be complex.

The relationship between the most useful library and primary research interest is shown in Table 137. Researchers in psychology and statistics were more likely than other researchers to find the main library of their institution the most useful. At the other extreme, only 29 per cent of researchers in history and 44 per cent of those in political science found the main library the most useful. Researchers in education[1] and statistics were more likely than others to find departmental libraries the most useful. Researchers in geography and history were more likely than other researchers to find local libraries especially useful for research. In addition to the main libraries in their own institutions, the most useful libraries for researchers in history were local libraries and special collections.

There was a relationship between type of library and frequency of use of types of information (Table 138). Respondents who made little or no use of historical information were more likely than others to rate departmental and main libraries as the most useful. Those who made little or no use of methodological and conceptual material were less likely than others to rate departmental and main libraries as the most useful, but more likely to give local libraries and the British Museum Library as the most useful. On the other hand, researchers who made very frequent use of historical material were more likely than other respondents to use local collections and the British Museum Library;

---

[1]School of education libraries were coded as "departmental"; obviously a high proportion of those working in education would express a preference for their school library, as in many universities books on education are not stocked in the main university library.

these data are consistent with those reported in Table 137, where the most useful library was related to primary research interest. However, the number of respondents who used local libraries and the British Museum Libraries was relatively small, and not too much importance should be attached to these results.

The frequency of use of statistical material was unrelated to the library judged to be the most important for research.

In summary, it can be seen that researchers in history spread their net much more widely, and statisticians less widely, than other social science researchers. This finding received further support from the data in Table 139, where the type of library rated as most important was tabulated against judged usefulness of types of information.

The relationship between type of library found most useful for research and physical forms of material used in research was not significant and is not, therefore, reported in tabular form. In the main, neither the type of material used, nor the frequency with which it was used, was associated with type of library found most useful in research. Researchers who made little use of books or periodicals in their research tended to use special libraries more frequently than other researchers. It could be that this group of users (because of the nature of their subject) found most of their research material in unpublished sources and/or reports, and therefore required special collections and special libraries.

Respondents who judged abstracts/indexes to be most useful for finding references for their research were more likely than other researchers to give departmental or main libraries as the most important library, and less likely to mention special libraries. The same was true for those who judged consultation with colleagues to be most useful for locating references for research. Otherwise, the method used to trace references for research was largely independent of the type of library found useful (Table 140).

Adequacy of local book-stock (Question 35). Respondents were asked to indicate whether the book-stock of the library of their own institution was sufficient for all, most, some, few, or none of their requirements.

Thirty-three per cent of all respondents reported that local book-stocks could satisfy most of their requirements, 36 per cent felt that some of their requirements could be satisfied, but only 4 per cent said that all of their requirements could be satisfied. Three per cent reported that local book-stocks satisfied none of their requirements.

Respondents from Oxbridge and government departments were much more likely to have all of their requirements satisfied by local book-stocks than were respondents from anywhere else (Table 142). Respondents from Scottish universities and independent research establishments were more likely than other respondents, Oxbridge and government social scientists apart, to have most of their requirements satisfied locally.

The oldest respondents (i.e. 51 and over) were more likely than others to find that local stocks satisfied all of their requirements (Table 143).

There was a highly significant relationship (Table 144) between the adequacy of local bookstocks and the number of libraries used in research. Respondents who used only one library were more likely to find that their local book-stock satisfied all or most of their requirements than were those who used more than one library. The same tendency was apparent for those who used two, three, four, five, or six libraries. Logically, it should be the case that respondents who stated that they never used libraries for their research (only 2 per cent) should also state that their local stocks satisfied none of their requirements. The fact that respondents who make use of no libraries for their research are distributed across the various categories of adequacy must be attributed to error[1] on the part of

---

[1] The estimation of error in this particular table is fairly easy to assess, because respondents cannot use no libraries and have all their requirements satisfied, for example, by their own institution's library. Errors of response could arise from misreading of the question, a failure to understand the question, or a correct understanding of the question followed by answers placed in the wrong position in the spaces provided in the questionnaire.

respondents in answering this question.

Respondents who made frequent use of historical and descriptive material were less likely to have their requirements satisfied locally than were those who made little or no use of this material (Table 145). On the other hand, heavy users of methodological and conceptual material were more likely than light users or non-users to have most of their requirements satisfied locally. No such pattern occurred in the case of statistical material.

When adequacy of local book-stocks was related to importance of different types of information (Table 146), a slightly different picture emerged. Those who judged historical data to be very important for research were less likely to have their information requirements satisfied by local book-stocks than respondents who judged historical material to be of little importance. For respondents using methodological and conceptual material there was an opposite tendency; those who judged these materials to be important were more likely than those who did not to have their information requirements satisfied locally. In the case of descriptive and statistical material there was little relationship between judged importance and adequacy of local library.

The relationship between the use made of physical forms and satisfaction of information requirements by local book-stocks is given in Table 147. There was little indication that the ability of local libraries to satisfy demands was related to different physical forms or to the frequency with which they were used. One or two tendencies were noted. Heavy users of newspapers for research purposes were less likely than light users to find local book-stocks adequate.[1] This was also true of heavy users of books, although the tendency was not so strong. There was an interesting relationship between frequency of use of colleagues for transfer of information and adequacy of local book-stocks. Those who found discussions with colleagues in their own institution to be of value were less likely to have their information needs

---

[1] This is not an unexpected finding; most heavy users of newspapers who were interviewed used either local newspaper offices or the British Museum newspaper section at Colindale.

satisfied by local book-stocks than were respondents who infrequently communicated with local colleagues. But the opposite was the case when frequency of contact with persons in other institutions was related to adequacy of local book-stocks; those who made no use of this communication channel were more likely than those who did to judge local book-stocks adequate. This was one of the few instances in which there was a clear difference between colleagues in own institution and persons in other institutions. Perhaps the value of a person in another establishment lies partly in his knowledge of what his own library has to offer. A researcher who found most of his research material locally would not need this type of external contact.

Extent of interlibrary borrowing (Question 34). Respondents were asked about the percentage of books and periodicals that had to be borrowed from libraries other than the library in their own institution. Twenty-two per cent of respondents made no borrowings (Table 148). Thirty-eight per cent borrowed between 1 and 10 per cent of the books and periodicals they required for research. Only 4 per cent of respondents had to borrow more than 90 per cent of materials required. When the proportion of books and periodicals borrowed from other libraries was tabulated against the adequacy of local book-stocks, there was, as would be expected, an inverse relationship between the two variables. Very heavy external borrowers (those who borrowed 90 per cent of their materials) accounted for only 4 per cent of all respondents, but 29 per cent stated that local book-stocks met none of their needs.

3.2.12 Requirements for older published materials (Question 38)

Respondents were asked to indicate the age of books and periodicals they required for their research. Ninety per cent of respondents made some use of material published before 1945, and as many as 6 per cent of the sample made use of material published before 1800 (Table 151).

Researchers in economics, and to a lesser extent in education, were much less likely to use material published before 1945 than were other users (Table 151). Nearly all researchers in anthropology and geography, and all those in history, made use of material published before 1945. The few researchers in statistics who were

included in the analyses required material going back as far as the 1851-1900 period. Twenty-five per cent of psychologists required material published in the 1919-1930 period, and 14 per cent required material from the 1901-1918 period, but requirements for material predating 1900 fell off appreciably: this was also the case with economics and statistics. Researchers in anthropology, geography, and history required material published between 1801-1850, and also before 1800. The requirements of researchers in anthropology and history, especially for older material, could be predicted, but the requirements of geographers for material up to 170 years old was unexpected.

When age of material required was related to type of research, it was apparent that researchers in methodological, clinical, experimental fields, and applied fields made less than average use of material published before 1945 (Table 152), and some interesting relationships emerged when these variables were further broken down by primary research interest (Tables 153-159). The majority of research was experimental, especially so in the case of education where 165 of the 258 respondents with a primary interest in education were in the experimental field, and in psychology where 203 of the 222 psychologists were in the experimental field. In economics respondents were distributed across most of the categories of research: quite a few economists, for example, were working in mathematical, statistical, or financial fields.

In the case of experimental research there was a fairly definite need, in most disciplines, for older material and especially for material published between 1919 and 1945. Fifty-five per cent of researchers with a primary interest in sociology whose research was coded as experimental required material published between these dates: in psychology the figure was 65 per cent; politics 53 per cent; geography 51 per cent; education 58 per cent; economics 53 per cent; and in anthropology 44 per cent.

If research was not experimental then it was next most likely to be historical; and nearly all respondents in this field used material published before 1945.

The most unusual and complex relationship between these three variables (type of research, age of material, and primary research

interest) was in the case of researchers in economics. Seventy-four respondents with a primary interest in economics were in applied research (very few other social scientists in the sample were in applied research), and this group was less likely to use material published before 1945. than was any other single group. In fact, 39 per cent of the researchers in applied economics had no use for older material. On the other hand, researchers in theoretical economics were more likely than any other group to require material published between 1931-1945. Researchers in economics whose research was coded as financial were also less likely than others to require older material. Researchers in economics where type of research was coded as statistical required older material; for example, only 13 per cent of these respondents never used pre-1945 material and 26 per cent required material published before 1900.

Nearly all respondents who judged anthropology, economic statistics, history, literature, philosophy, and arts subjects of marginal relevance to research required material published before 1945. There was an appreciable use of material published before 1800, especially by researchers who gave economic statistics, geography, history, literature, and arts subjects as marginal disciplines. At the other extreme, respondents who cited accountancy and social administration as marginal disciplines were not nearly so likely to use pre-1945 material.

The relationship between frequency of use of each type of information and age of material is given in Table 160. Respondents who made heavy use of historical and descriptive material made more use of material published before 1945 than did respondents who made little or no use of historical and descriptive material. The reverse trend was apparent in the case of statistical material: heavy users of statistical material were less likely than light users to make use of material published before 1945. In the case of methodological and conceptual material there was little association between frequency of use and the age of material required. It should be noted that those respondents who made no use of older material accounted for only 10 per cent of respondents, but they showed a differential use of historical, descriptive and statistical data.

There was a similar relationship between age of material and judged

importance of information types (Table 160). Respondents who judged historical and descriptive material to be very important for their research were more likely to require older material than respondents who judged this type of material to be of little importance. The reverse trend was again apparent for statistical data: where statistical data were judged to be very important there was less demand for the older material. The same was true for methodological information (Table 161), where respondents who judged methodological material important were less likely to make use of the older material than those respondents who judged it to be of little or no importance. The importance of conceptual material was largely unrelated to age of material required.

There was a relationship between number of volumes owned personally and age of the material required (Table 162). Researchers who did not require material published before 1945 were more likely than respondents who did to own fewer volumes.

There was no strong relationship between number of volumes that a researcher had to borrow on interlibrary loan and age of the material required, with one exception: of those respondents who made no use of material published before 1945 (23 per cent of respondents fell into this category), a much higher proportion than average made no borrowings from other libraries. Such respondents were perhaps either experimentalists (who would generate much of their own data, as in experimental psychology) or theoreticians (who might make use of a small number of books contained either in their own collections or the libraries of their own institutions). Also, libraries are usually better off for recent than for older material, especially newer libraries.

There was no significant relationship between adequacy of local book-stocks for research and age of material required.

3.2.13 Keeping abreast of new publications (Question 40)

Methods. Respondents were asked to indicate how they kept informed of current publications in their field(s) of research. On average each researcher mentioned two sources which he used for current awareness purposes.

Scanning of abstracting and primary journals[1] was used much more frequently than any other method for keeping abreast of new publications. Forty per cent of mentions (some respondents gave more than one method) were of these two sources. An appreciable number of respondents mentioned browsing in book shops and scanning book reviews (13 per cent), and use of personal contacts for keeping abreast of new publications (19 per cent). Other sources (e.g. printed bibliographies, books, conferences) were coded, but these sources were very infrequently mentioned (Table 167). Review articles, communications from professional societies, conferences and conference proceedings, and printed bibliographies appeared to serve very few current awareness functions.

A very noticeable feature of these data is the negligible role played by review articles. This contrasts markedly with the position in science where review articles are important and relatively easy to retrieve. There are an appreciable number of review articles in the social sciences, although they tend to be unevenly scattered across disciplines, and are found in a wide range of primary journals. It is suspected that social scientists do not use them frequently because they are either unaware of their existence or find them difficult to retrieve.

There were some noticeable differences between environments with respect to methods used for current awareness (Table 167). Researchers from the London colleges were more likely than researchers from elsewhere to browse in book shops and scan book reviews. Government social scientists were much less likely than others to use this source for current awareness. It is clear that physical access to material will have a strong influence upon the frequency with which researchers browse. Obviously researchers in London have facilities unmatched in most of the country; and researchers in government departments do not spend much of

---

[1]Scanning of abstracts found in primary journals was also included in this category. In retrospect, it would have been preferable to have coded scanning of abstracting journals and scanning of primary journals separately. In view of the infrequent use of abstracting (see 3.2.9) it is likely that the large number of mentions to the scanning of abstracting and primary journals as a method of keeping abreast of new publications (Table 167) are really to the scanning of primary journals and not to the scanning of abstracting journals.

their time in places offering facilities for browsing.

Social scientists in government departments were more likely than others to use abstracting and primary journals for current awareness. Researchers from London colleges and from the Scottish universities scanned abstracting and primary journals for current awareness purposes slightly less than other respondents.

The importance of personal contacts in the communication of current information varied considerably from one institution to another. Researchers at non-university research institutions were particularly active on this front, and they were followed closely by researchers from Oxbridge. At the other extreme, respondents from colleges of education made relatively little use of personal contacts for current awareness.

For respondents from government departments conferences played a negligible part for keeping abreast of new publications. Researchers from colleges of education seemed to make a little more use of professional societies and conferences for the communication of current information than did researchers from other environments, but the difference was not very great.

In addition to the methods used for current awareness that were coded, a fairly large number of other methods were mentioned by respondents (no single method was mentioned frequently, and they were all coded as in a single category "other"). Researchers from the technological and Scottish universities, and from government departments, mentioned "other" channels of communication more frequently than did researchers from other environments. This may have been due to a wider scatter of channels for this group.

The method by which a researcher came to know about current publications and information was largely unrelated to seniority or status. For example, research students were just as likely as professors to use personal contacts to get to know about current publications (Table 168).

The relationship between subject of research and methods of keeping informed of current publications is given in Tables 169-170. Researchers in geography, psychology, and statistics were more likely than others to use abstracts and journals for current awareness. This was perhaps because geography and psychology are well served, each by one good abstracting journal. Researchers in geography and psychology were less likely than others to use browsing in book shops or scanning book reviews for current material. Researchers in education also used abstracting journals as heavily as geographers, but they were as likely as other respondents to make use of browsing in book shops and scanning book reviews. Researchers in statistics often gained current information through conferences and conference proceedings.

Secondary research interests. When secondary research interests were related to current awareness activities, a rather different picture emerged. Geography and statistics when given as secondary research interests were not associated with a greater than average use of abstracting and indexing journals. This was not the case in psychology: respondents with either a primary or a secondary research interest in psychology made greater than average use of abstracting and indexing journals. Statistics as a secondary research interest was not associated with a greater than average use of conferences and conference proceedings - as it was when given as a primary research interest. Psychology as a secondary research interest was associated with a greater than average use of conferences and conference proceedings for current awareness. Perhaps the most interesting relationship between current awareness and secondary research interests was in the case of anthropology, where respondents were much more likely than average to gain information through personal contact, although these were not the ones gained at conferences, because no researcher with a secondary research interest in anthropology said that conferences or conference proceedings were of any use at all for current awareness. Anthropology as a secondary research interest was associated with a much smaller than average use of abstracting journals, and a greater than average use of browsing in book shops, and book reviews.

As a secondary research interest, geography was associated with a higher than average use of printed bibliographies (in fact this was about the only instance where printed bibliographies were used to any appreciable degree), a smaller than average use of book reviews and browsing in book shops, no use of conferences and conference proceedings, less than average use of personal contacts, no use of professional associations or reviews, about average use of abstracting journals and journals, and an average use of other sources of information.

Further light on the interrelationships between research topic and method of keeping up to date with the literature is shed by the three-way tabulations (Tables 171-175). Researchers in economics with a secondary research interest in history or statistics followed a very similar pattern in keeping informed of current publications to researchers whose primary and secondary research interests fell within mainstream economics. Researchers with a primary research interest in education and a secondary research interest in sociology used similar methods for keeping informed of current publications to researchers with primary and secondary research interests in education. Researchers in education with a secondary research interest in psychology were slightly more likely than others in education to keep informed of current publications by scanning abstracting journals and journals in their field. This is in keeping with the higher than average use made of bibliographical tools (especially abstracting journals) by psychologists. The mainstream political scientists used more methods to keep informed of current publications than those respondents with a primary research interest in politics and a secondary research interest in sociology: 25 per cent of the former group said that they used methods of keeping informed which were not coded, as opposed to 16 per cent of the latter group.

Experimental psychologists made heavy use of abstracts and journals for keeping informed of current publications, and this was also the case with the only other sizable group of researchers in psychology (i.e. researchers with a primary research interest in psychology and a secondary research interest in sociology). The social psychologists

were only slightly less likely than the experimental psychologists to use abstracting journals for current awareness functions. Respondents with a primary research interest in sociology and a secondary research interest in education did not differ with respect to this variable from respondents whose primary and secondary research interest was in mainstream sociology. This is in agreement with the previous relationship mentioned above, when the researchers with primary and secondary research interests in education were compared with the researchers in education with a secondary research interest in sociology. Again, this seems to reflect the influence that psychology exerts upon the use of bibliographical tools, because those respondents with a primary research interest in sociology and a secondary research interest in psychology were more likely than those researching in sociology alone to use abstracting journals.

The economic historians used more methods for keeping informed of current publications that were not coded than did any other group. This is clearly seen in the case of researchers with a primary research interest in history and a secondary research interest in economics: 32 per cent of this small group of 28 respondents used "other" methods for keeping informed of current publications.

From the interviews the impression was gained that researchers took less trouble to find relevant references and to keep up-to-date with material from disciplines outside their own main field of research. The material that did come from other disciplines was rarely the result of systematic searches, and was often picked up rather accidentally in reading monographs and periodicals. When the data in Table 176 was compared with that in Table 169, psychology, geography and statistics were not associated with special patterns of current awareness activity, as they were when given as subjects of primary research. In fact, when geography was given as a marginal discipline, researchers were slightly less likely than average to use abstracting journals and journals for current awareness, although researchers in geography were very heavy users of these tools.

Types of information (e.g. historical, descriptive, statistical). When the methods used for keeping informed of current publications were related to frequency of use of types of material, few interesting associa-

tions emerged. Researchers who used statistical information frequently were less likely to use browsing for keeping informed than respondents who made little or no use of statistical material. The same pattern was apparent between frequent and infrequent users of conceptual and methodological materials. A slight tendency in the opposite direction was apparent in the case of historical and descriptive materials.

A similar pattern emerged when importance of types of information was related to method of keeping informed of current publications. The only noticeable association was with extent of browsing: those who regarded statistical, methodological and conceptual material as important browsed less than those who regarded these types of information as relatively unimportant.

Frequency of use of physical forms, and methods of locating references for research, were both largely unrelated to method of keeping informed of current publications.

Importance of speed (Question 39). Respondents were asked to indicate the importance to their current research of knowing about new material very soon after publication. Eighty-four per cent of respondents said that this was very or moderately important, and only 15 per cent noted that this was not very important.

Respondents from the technological and Scottish universities were more likely than others to judge speed important. However, the differences were not statistically significant, and are not therefore reported in tabular form.

Researchers in anthropology, history and statistics did not demand to know about material as soon after publication as did other researchers.

When subject specialities were refined a little more by combining primary and secondary research interests, some differences within disciplines were apparent with respect to demands upon speed. For example, in the case of economics, 54 per cent of researchers whose primary and secondary interests were in economics said that speed was very important, whereas only 17 per cent of respondents with a mainstream interest in economics but a secondary research interest in history said so (33

per cent of this latter group indicated that speed of notification was not very important at all, Table 164). Researchers whose primary and secondary research interests were in sociology were more likely to rate speed as important than researchers with a primary research interest in sociology and a secondary research interest in a subject not recorded during coding (there were in fact 52 respondents with a primary research interest in sociology and a secondary research interest in some other subject falling outside the main social science disciplines).

In some disciplines, respondents who were engaged in full-time research rated speed less important than respondents who combined research with teaching. This was so in anthropology, economics, geography, and politics. In education and sociology, respondents who combined teaching with research did not rate currency as highly as full-time researchers. In psychology there was no difference between full-time researchers and those who combined teaching with research (Table 165).

The importance of knowing about new material soon after publication was unrelated to the frequency with which historical or descriptive material was used (Table 163). Respondents who made heavy use of statistical, methodological, and conceptual material were much more likely than those who made little or no use of these types of information to want swift notification of new publications.

There was a slight but persistent tendency for researchers who made little or no use of any particular method for finding references to be less demanding in terms of currency of new publications.

The complexity of making relevance judgements about currency of information services is well illustrated by the experience of the Experimental Information Officer at Bath. During informal conversations with clients, including spontaneous comments on the current awareness services provided, only one, a sociologist, involved more with teaching than research, mentioned speed when evaluating the service.

Tolerable delay between publication and abstract (Question 41). Respondents were asked to indicate the delay that they were normally prepared to tolerate, ignoring extreme cases. Only 8 per cent of respondents were not prepared to tolerate a delay of more than one month. Twenty-nine per cent were prepared to tolerate a delay of one to three months, 30 per cent could tolerate a three to six months delay, and 11 per cent were prepared to tolerate a delay of over one year (Table 177).

Environment was not an important factor, but it was noted that the technological universities, and to a lesser extent respondents from the new universities, Scottish universities and independent research institutes would tolerate slightly less delay than respondents from other environments.

Researchers in anthropology and history were prepared to tolerate much more delay than researchers in other disciplines (Table 177). Researchers in these disciplines were followed by those in politics, sociology, economics, geography, education, and psychology (in ascending order) in demands for speedy abstracting and indexing. The disciplines characterised by empirical and experimental methods (i.e. psychology, geography, education) were those in which speedy abstracting and indexing services were most important. There were one or two exceptions. Although researchers in psychology were the most demanding, only one per cent of the respondents whose primary interest was in psychology stated that they would tolerate a delay of less than one month. There was also a small minority in economics, education, and statistics who demanded a delay of less than one month.

A similar picture can be seen in the data in Table 178, where tolerable delay was related to secondary research interest. Again, researchers in psychology and education demanded less delay than those in other subjects. Researchers with a secondary interest in history, statistics, and politics, would tolerate delays of one year and over more often than researchers with secondary interests in other subjects.

Researchers in applied research (nearly all these were in applied economics) were the most demanding with respect to speed of publication of abstracts. Nineteen per cent of these respondents wanted a delay of less than one month (Table 179). Researchers using experimental techniques were also fairly demanding. Researchers using methodological and historical material, and to a lesser extent those in theoretical research, were the least demanding.

Respondents who gave economic history as a marginal discipline were more likely to tolerate delays of over a year than any other researchers. Respondents who gave biological, scientific, and computing subjects as marginal disciplines were unlikely to tolerate delays exceeding one year.

The type of material required was not clearly associated with tolerance of delay in appearance of abstracts. There were two exceptions: respondents who made very frequent use of statistical material were slightly less tolerant of delays than researchers who made little or no use of statistical material; and the same was true for those who made heavy use of conceptual material. A very similar pattern was apparent when importance of information types was related to acceptable delay.

There was little relationship between frequency of use of physical forms and delay tolerated.

There was a slight tendency for respondents engaged in full-time research, as opposed to those who combined research with teaching, to be a little more demanding with respect to appearance of material in abstracting journals (Table 180). This tendency was found in the case of researchers in education, politics, and sociology, but not for researchers with a primary interest in economics, geography, or psychology.

The judged usefulness of methods used to discover references for research was largely unrelated to delay tolerated in appearance of abstracts (Table 181). There was, however, an interesting polarisation of respondents who found abstracts of little or no use in discovering references: these respondents would tolerate either a very short delay (of less than a month) or a very long delay (twelve months or more). There was also a slight tendency for those who found consultation with experts, discussion with colleagues,

searching library shelves, and bibliographies and references in books and articles to be of no use for finding references to be polarised across the two extremes: that is, they would tolerate either delays of less than one month or more than twelve.

Researchers who used many abstracting and indexing journals were less tolerant of delays than those respondents who used only one (Table 182). However, the relationship was not strong. Also, there was little relationship between the judgements of the relative value of an abstract as against author/title entries in assessing relevance of references for research, and delay tolerated in appearance of abstracts.

Researchers who rated as important speed of getting to know soon after publication what is being published were less likely than others to tolerate delays of less than one month, whereas those who did not rate speed very highly would tolerate delays of over twelve months (Table 183). This relationship was to be expected, and the strength of the relationship gives evidence of the validity of the two questions relating to current awareness.

3.2.14 Keeping track of current research in progress (Question 42a).

Methods used. Respondents were asked whether or not they tried to keep track of current research in progress relevant to them, and if so, to explain briefly how they did this. Eleven per cent of respondents said that they did not attempt to keep track of current research. It was possible to code the other answers according to the categories given in Table 184.

The two principal methods for keeping track of current research in progress were on the one hand the informal communication network of personal contacts, and on the other, the formal system of scanning abstracting journals and periodicals. The data in Table 184 give some indication of the relative importance of these methods. The informal system, at least with respect to current awareness, appeared to be much more important. On average each respondent mentioned 1.6 methods for keeping track of current research. Thirty-seven per cent of total

mentions were to the informal system, and only 18 per cent to the formal system. Registers of current research accounted for 11 per cent of all mentions, and the rest of the formal methods were accounted for by references in books, reviews, SSRC Newsletter, and a number of other sources not coded (6 per cent).

Environment. When method of keeping informed was related to environment (Table 184) respondents from Oxbridge and from colleges of education were the most noticeably different from the general pattern. Respondents from Oxbridge relied particularly upon the informal network, and less than other respondents upon scanning abstract journals and periodicals. There was also a slight tendency for respondents from Oxbridge to make no attempt to keep informed, and this finding was backed up by impressions gained subsequently from interviews. A good number of respondents (22 per cent) from colleges of education reported that they made no attempt to keep informed of current research in progress. These respondents also participated to a much smaller extent than other respondents in informal communications.

Researchers from government departments followed closely the pattern of respondents from the universities (with the exception of Oxbridge).

Status of respondents. There was no evidence (Table 185) to suggest that method of keeping track of current research was related to status; and with one or two exceptions, there was little relationship between method of keeping track and primary research interest (Table 186).

Research interests. Respondents with a primary research interest in geography and sociology were slightly more likely to keep track of current research than were other respondents. Researchers in anthropology and psychology were less likely to use registers of research than other respondents. Researchers in statistics made less use than others of communications through personal contacts. Researchers in political science, history and statistics were slightly less likely than other researchers to keep track of current research. Otherwise, the methodsused for keeping informed about research in progress were much the same from one subject to another. There was only a slight relationship between methods used to keep abreast of current research and secondary

research interest (Table 187). Researchers with a secondary research interest in anthropology were much more likely than average to use informal channels of communication, and researchers with a secondary research interest in geography more likely than average to use conferences and conference proceedings. Anthropology, sociology, and statistics (as secondary research interests) were associated with a less than average use of registers of research for keeping track of information on current research in progress.

Respondents whose research was theoretical were less likely than researchers with a strong interest in methodological issues to keep informed of research in progress (Table 188). Research registers were most useful for tracking down current research when research was methodological or historical, and least useful when it was applied, or statistical. Where research was classified as international or comparative, the scanning of journals and abstracting journals was not particularly helpful for keeping in touch with current research, and in this case personal contacts were by far and away the most frequently mentioned method.

When the main social science subjects were mentioned as marginal disciplines, they were associated with the same patterns, as regards methods of keeping up with research in progress, as when they were mentioned as main research topics.

Anthropology as a marginal discipline was associated with a higher than average use of conferences and conference proceedings for this purpose (Table 189). Some of the subjects that fell outside the main social sciences (e.g. philosophy, biology) were associated, as marginal disciplines, with unusual patterns of keeping informed, although the number of respondents citing these disciplines was very small. For example, researchers with marginal interest in social administration were about the only group of researchers to make an appreciable use of professional societies for keeping informed of current research. The experience of the Experimental Information Officer confirms this finding. Researchers with a marginal interest in accountancy made comparatively little use of informal networks of communication, and were the only group to use SSRC Newsletter to any extent. Respondents with a marginal interest in literature and philosophy were less likely than average to make any attempt to keep track of current research in their main fields of interest.

Type of information. In the main, methods used for keeping track of current research were unrelated to the frequency of use of information types (Table 190). The use of research registers proved an exception: researchers who made frequent use of methodological and conceptual material were less likely than researchers who made no use of these materials to use a research register for keeping in touch with current research. There was also a slight tendency for researchers who made frequent use of descriptive, statistical and methodological materials to be less inclined to keep track of current research than respondents who made no use of these materials. This finding is rather unusual, because respondents making heavy use of any given type of material have in other analyses tended to be heavy users of all communication channels.

Use of physical forms. The frequency with which physical forms of information were used was largely unrelated to methods of keeping track of current research, except in the case where conferences and personal communications (both in own and other institutions) were used as methods of keeping track of current research. Respondents who made heavy use of conferences and contacts with persons (both in their own and in other institutions) were more likely to keep in touch with current research, especially by means of personal contacts, than respondents who made no use of conferences and contacts with colleagues. This was especially the case with respondents who made heavy use of persons outside their own institution. It would seem that researchers who go to the trouble of establishing and maintaining contacts with persons outside their own institution are much more active in informal networks of communication than other respondents; and, perhaps, come to rely upon the informal network more and more. However, the present data give no suggestion that heavy users of informal networks neglect the formal channels.

Methods used to trace references for research. Although the relationship between usefulness of methods for tracing references for research and methods used to keep track of current research was slight, there was a noticeable tendency for researchers who found informal contacts very useful for finding references to be more likely to keep track of current research than researchers who did not use informal contacts for this purpose (Table 191). Also those who found special bibliographies useful for reference seeking were more likely than those who did not to keep track of current research.

Special problems. It has been seen in the previous section that the majority of researchers made some attempt to keep track of research in progress, and that personal contacts and the scanning of abstracting journals and periodicals were the two most important methods used. Respondents were also given the chance to outline special problems they might have experienced in keeping track of research (Table 193). Just over one third of respondents answered this question, and the average number of problems specified by each respondent was 1.3. The question was open-ended and it was post-coded.

One quarter of all problems were scored in the category "other". A great variety of problems was mentioned, but no single problem scored under the category "other" accounted for more than 2 per cent of the total mentions. The problems that were coded were, in order of frequency of mention: (a) lack of published information; (b) incomplete/out of date registers; (c) research in other countries difficult to trace; (d) time involved in tracing research too great; (e) non-cooperation from other workers; (f) the mass of material too great to work through; (g) no central indexing/abstracting services for research in progress; (h) physical access to published material difficult; (i) field of research too small to warrant time spent in tracking down current research.

There was a good deal of variation from one environment to another and between researchers of different status in the problems experienced in keeping track of research. This is in contrast to many of the information seeking and gathering activities already considered, where the factors of environment, status, and even subject of research tended not to be related to information seeking and gathering activities.

Researchers in government departments and technological universities mentioned many more problems than researchers in other environments. Nearly half of the respondents from the government departments (Table 193) mentioned problems in the "other" category. (It must be noted that there were only 13 government social scientists who responded to this question.)

Respondents from Oxbridge were much more likely than other respondents to find the amount of available material overwhelming, and therefore presenting a problem for keeping track of research in progress. Oxbridge respondents were much more likely than others to be aware of the lack of

published information about current research, and to complain about the non-cooperation of other researchers. They were less likely than other respondents to mention problems of time and the lack of central indexing/abstracting services for research in progress. Respondents from the London colleges, redbrick and new universities all followed the average pattern in their replies to this question. The problems mentioned by respondents from the technological universities were much more varied, and more likely to fall into the "other" category. It was noticeable that no respondent from the technological universities mentioned the problem of keeping in touch with research from other countries. Respondents from colleges of education were much more likely than other respondents to note the absence of central indexing/abstracting services for research in progress and also to mention the problem of time.

Respondents with professorial rank emphasized the size of the relevant literature, the problem of foreign research and the lack of time (Table 194): that is, these respondents were much more likely to find existing services and materials competing for attention rather than to find the absence of any particular material or service a problem. They did, for example, mention incomplete/out-of-date registers of research much less often than other respondents. Research fellows and research assistants frequently mentioned the lack of published information about research in progress, and research fellows were particularly concerned about the difficulty of getting to know about foreign research. Assistant lecturers were much more likely than other respondents to mention deficiencies in registers of research. Research students were much more likely than other respondents to mention the lack of cooperation from other researchers as a barrier to keeping track of current research.

Respondents in geography were more likely than other respondents to mention the volume of available material and research in other countries as problems. They were less likely to complain about the time factor.

Researchers in education did not seem to be troubled so often as other researchers by the lack of published information about current research, but they were much more likely than others to mention lack of time (Table 195). This may reflect the heavier teaching load of most of these respondents. Researchers in psychology mentioned less often than others the lack of registers of research.

A rather different picture was seen in the relationship between problems found in keeping track of current research and subjects given as secondary research interests. This was unusual in the analyses. Usually the same association between a given discipline and other variables was apparent whether the discipline was given as a primary or secondary research interest. Researchers with a secondary interest in geography, and also those with a secondary interest in psychology, mentioned (Table 196) many more problems than other researchers (as indicated by the frequency of mentions categorized "other"). Researchers with a secondary research interest in psychology, and also those with a secondary research interest in sociology were less likely than others to mention the problem of foreign research. Those with a secondary research interest in psychology seemed to be less troubled than others by the lack of published material about current research: this was also the case for researchers with a secondary interest in history. Respondents with a secondary research interest in political science frequently mentioned a lack of cooperation on the part of other researchers and incomplete/out-of-date registers.

Researchers involved in theoretical research were more likely than others to mention the volume of material to be covered as a special problem, but apart from this group, no strong associations emerged between type of research and problems met in keeping track of on-going research, and the data are not reported in detail.

There was some evidence to suggest a relationship between usefulness of methods of tracing references and problems associated with keeping track of current research (Table 197). But there is no general pattern and too much reliability cannot be placed upon the results because of the small numbers in some of the cells. There are one or two interesting relationships, but they should be judged as no more than this. For example, respondents who found contacts with persons in places other than their own institution to be very useful in tracing references also mentioned the problem of keeping track of foreign research in progress much more frequently than did others. Respondents who found bibliographical tools useful in tracing references were more likely to mention the lack of a central indexing/abstracting service for tracing research in progress than were those who did not find bibliographical tools useful. There was some

evidence to suggest that those who made frequent use of any channel of communication or who found it useful were more likely than those who did not do so to have problems in keeping track of research in progress. Respondents who did not find consultations with experts, colleagues, and library catalogues, and searching of library shelves to be of any use in tracing references, also had more problems than those who did in keeping track of current research. Also, those who found consultations with librarians of use in tracing references were more likely than average to mention other problems associated with keeping track of research in progress.

Further comments on current awareness. In addition to the answers given to specific questions about keeping track of current research, researchers made a number of comments about the importance of getting to know of current research.

In science Price (1965), analysing the networks of citations in research papers, has suggested that each area of research is characterized by a "cutting edge" in which papers are tightly knit together, where there is a good deal of concentration, where the penalties for ignorance of the relevant current research are great, and where there is much activity in the way of pre-publication exchanges, and informal communications through the "invisible college".

If social science research is characterised by a "cutting edge" speed of communication ought to be important.

Some respondents mentioned particular problems about the organization and dissemination of information about current research, but there was no indication that keeping track of current research in progress was of paramount importance. Some respondents were more concerned about completeness of coverage than speed of dissemination. Suggestions included:

> Central index of all university research projects.
>
> World-wide current index of research in progress.
>
> An organized flow of multi-language information on current and recently completed research is desperately needed.

> Central (national or international) indexing service of new publications of research undertaken.

Other suggestions included document switching centres and data analysis centres. Some of the suggestions were not unlike the characteristics of the system now being operated by the American Psychological Association.[1]

> Central pool of information for the whole country, where current publications from all over the world are classified and translated. Abstracts of these should be filed and made available for a small fee.
>
> Encourage individuals to document and file any results of their research, especially if it is not published.
>
> Any proposals, summaries, news sheets or progress reports available in one institution could also be made available to others.
>
> Centralized filing of information and of research data collected or about to be collected by research organisations; and the storage of all such data in central data banks.

There were also suggestions for the development of informal communications:

> University departments could hold monthly informal gatherings to promote contacts, and cross fertilisation of ideas.

The problem of unarticulated information needs was touched upon by some respondents.

> If one doesn't find what one is looking for, how is one to know it exists?

Solutions to this problem would include central indexing services and registers of research (already mentioned), also publications giving details of research in progress. The scanning of such material would help to increase exposure to potentially relevant research.

In operating a current awareness service based on selective dissemination of information (SDI), the Experimental Information Officer at Bath

---

[1] National Information System for Psychology (NISP)

found that clients requested a different treatment for primary research areas as against marginal discipline interests. In the latter areas, sifting was done more rigourously, the tendency being to exclude references to work which may not be readily accessible, and to emphasize state-of-the-art material. Even in the areas of primary interest, clients often stated that the problem was not so much one of knowledge of what has been and is being published in a given area, but rather that the vast amount of material, even in fairly specialized fields, makes selectivity and evaluation a necessity.

Cross-tabulation of replies from Questions 40 and 42a. Answers to question 40 "How do you keep informed of what is being currently published in your field of research interest?" and question 42a "Do you try to keep track of current research in progress of relevance to you? If you do, could you explain briefly how?" were cross-tabulated (Table 191). In the coding of the answers to these two open-ended questions similar categories were used as far as possible. For example, respondents used personal contacts and bibliographies to keep informed of what was being published in their field of research, and also to keep track of current research in progress.

The entries in the diagonals in Table 191 are much higher than would be predicted by chance alone. This suggests that methods used for one purpose tended to be used, more often than not, for the other. For example, if conferences and conference proceedings were used for keeping informed of current publications, then this method was also used more often than average to keep track of current research in progress. The same was the case for personal contacts, books, etc.

Respondents who made use of bibliographies, conferences and conference proceedings, and personal contacts to keep informed of current published material were more likely than average to keep track of current research in progress (although it should be noted that the use of bibliographies and conferences and conference proceedings played a very small part overall in keeping researchers informed of current publications). Personal contacts were much more important, and were second only to the scanning of abstracting journals and periodicals in the frequency with which they were mentioned for this purpose. Browsing in bookshops and through book reviews was next in importance, followed by "other" methods (not

coded separately).

Conclusions. When asked to say how they kept informed of current publications in their fields of interest, each respondent mentioned on average two methods. Scanning primary journals and abstracts was by far the most common method used - it accounted for 40 per cent of all mentions - followed by personal contacts (which accounted for 19 per cent of mentions). Other methods were mentioned much less frequently. There was evidence to show that researchers in psychology, geography, and statistics relied much more heavily on abstracts than did other respondents. This may be accounted for, at least in part, by the existence of particularly good abstracting services in these disciplines.

Eighty-nine per cent of respondents made some attempt to keep track of research in progress. There was no difference between those who did attempt to keep track and those who did not with respect to the use of formal channels of communication. However, with respect to informal communications there was a difference: researchers who attempted to keep up to date with on-going research were particularly active in informal communications. It is suspected that informal contacts were found to be the easiest way of finding out about on-going research in one's own field of interest. It is suggested that registers of current research (where they exist) could be kept up to date and made more widely available, thereby improving this current awareness aspect of the formal system; but it is unlikely that the attractions of the informal system for current awareness could be displaced entirely by any modification or addition to the formal system.

The majority of social scientists were able to tolerate delays between publication of primary material and appearance in secondary sources of between one and twelve months. Only a small minority (8 per cent) would tolerate less than one month's delay, and on the other hand, another small minority (11 per cent) would tolerate delays of twelve months or more. This finding should be treated with caution; people tend to make "reasonable" demands in the light of their own experience of the problem. It may well be that if abstracting and indexing services were quicker, users would wonder how they could ever have

tolerated the delays to which they are at present subjected.

Unequivocal evidence is presented here to show that although social scientists do use abstracting and indexing journals, they do not use them very extensively. Further research could fruitfully be undertaken to assess the value of abstracting journals, as regards, for example, the coverage of the primary literature, and the delay between the appearance of primary literature and its reappearance in abstracting journals.

3.2.15 Capability in foreign languages

The questionnaire contained a section dealing with language problems. This section included questions about the extent to which respondents scanned literature in languages they read and about the way respondents dealt with items they came across which were in a language they did not read. Also, enquiry was made about choice of original research subject, and if the choice had been affected by what respondents believed to be the amount of English language material on the subject. Further details were requested about the extent to which research had been restricted or constrained because of language problems.

Languages read (Question 44). It can be seen from Table 198 that 18 per cent of respondents could read no language other than English. A knowledge of French was claimed by 75 per cent, and 27 per cent could read German. Only 4 per cent could read any Russian. An additional Romance language was known by 14 per cent; this was usually Spanish, Latin or Italian.

Table 199 shows relative capability in dealing with French, German, and Russian. Only 22 per cent of the respondents could read both French and German; and these must be regarded as the best equipped in terms of dealing with the major foreign language publications in the social sciences. A further 49 per cent could read

French only. Statistically, respondents could read on average 1.6 foreign languages.

In the discussion which follows, percentages were calculated as a percentage of total number of respondents in each table.

Age. There was little relationship between languages read and age, although there was a slight tendency for researchers in the 50-and-over age group to read more foreign languages than younger researchers.

Qualifications and environment. Respondents with higher qualifications were more likely to be able to read foreign languages than respondents with lower qualifications, or with no qualifications (Table 201). Respondents with qualifications in anthropology, political science, geography, economic statistics, and arts subjects were more likely to be able to read a foreign language than were other respondents. Those with a qualification in education were the least likely to be able to read foreign languages. Respondents from Oxbridge, the new universities, and the Scottish universities were more likely than others to be able to read a foreign language. College of education staff were less likely than other groups to read foreign languages. Respondents with over 30 years' research experience were more likely to know a foreign language than were other respondents, and they were also more likely to be able to read Russian than other respondents (Table 203).

Research interests. Researchers working and qualified in anthropology, geography, political science, and history were more likely to be able to read foreign languages than were researchers in other subjects (Tables 201 and 204). Ability to read German was particularly common among researchers in anthropology and history. When anthropology, geography, political science, and history were given as secondary research interests they were also associated with a good knowledge of foreign languages. Researchers whose work was mainly

theoretical, historical, or international and comparative, were stronger in foreign languages than other respondents. Researchers in theoretical and statistical research had a better knowledge of German than did others (Table 206).

Use of information types. In the main, the frequency with which different types of information (e.g. historical) were mentioned was unrelated to language abilities (Table 207). There was, however, a slight indication that respondents who rated historical and descriptive material as important were more likely, and that respondents who rated statistical, conceptual, and methodological material of importance were less likely, to read foreign languages than were other respondents.

No association emerged between number of languages read and use of methods of finding references for research. The number of abstracting journals used was also unrelated to language capability.

Respondents who owned a large personal library were more likely to read foreign languages, especially German, than respondents who owned very few volumes (Table 208). Also, respondents using more than one library could read more languages than respondents who used only one library (Table 209).

3.2.16 Foreign language material: scanning the literature (Question 45)

Respondents were asked to state whether or not they regularly scanned literature in the languages they read. Between 150 and 200 fewer respondents answered this question than answered the previous one (Question 44) which dealt with the languages they read. This discrepancy was not accounted for entirely by the 11 per cent of respondents (that is, about 100) who read no foreign languages.

Of respondents who did read foreign languages, only one third regularly scanned literature in foreign languages. Literature in French was scanned by about twice as many respondents as literature in German. Only 13 respondents said they scanned material in Russian.

Environment. Researchers from the London colleges were more likely

than other researchers to scan literature in foreign languages. Respondents from colleges of education, government departments and other research institutes were much less likely to scan foreign material than were other respondents. Only 24 respondents from government departments and 19 from colleges of education replied to this question. Russian was much more widely read at Oxbridge than at the other universities (Table 210). Otherwise, there were few differences between institutions.

Status. There was a fairly clear relationship between the scanning of foreign material and status (Table 211). Apart from students, senior researchers were more likely to scan foreign material than junior researchers. Research students, however, were as likely to scan foreign material as any other respondents. It is possible that age of researchers may have a bearing on the relationship between status and scanning foreign material, because it was seen that scanning of foreign language literature increased with age (the research students apart).

Primary and secondary research interests. Respondents researching in geography and anthropology were more likely to scan foreign material than were other respondents, and those in psychology, economics, and education were less likely to do so (Table 212). Geography as a secondary research subject was strongly associated with scanning of foreign material; two thirds of respondents giving geography as a secondary research interest said they scanned foreign material. Political science was also associated with a heavy use of foreign language material. Those who gave psychology as a secondary research interest were unlikely to scan foreign material (Table 213). In this sense, researchers with a secondary interest in psychology, behaved similarly to those with a primary research interest in psychology.

The data from the 3-way tables (Tables 214 to 218) where primary and secondary research interests were tabulated against the scanning of material in foreign languages indicate that researchers in the mainstream social science disciplines did not always engage in this activity to the same extent as those with cross-disciplinary interests. For

example, in the case of economics, 24 per cent of respondents with a primary and secondary research interest in economics scanned material in foreign languages, whereas 47 per cent of respondents with a primary interest in history and a secondary research interest in economics scanned foreign language material. There was a complex relationship between the cross-tabulation relating education and sociology as primary and secondary research interests. Researchers with primary and secondary research interests in sociology were more likely to scan foreign material (44 per cent) than researchers in education with a secondary research interest in sociology (20 per cent). When the relationship between education and sociology was reversed, that is when sociologists with a secondary research interest in education were compared with researchers with a primary interest in education, such a difference was not apparent; 25 per cent of sociologists with a secondary research interest in education scanned material in foreign languages, and 30 per cent of the respondents with primary and secondary research interests in education did so.

Type of research. Respondents whose research could be classified as applied were less likely than other respondents to scan foreign language material. Those whose research could be classified as international or comparative were, as would be expected, much more likely to scan foreign language material than other researchers (Table 219).

Use of information types. It was clear that those who made frequent use of historical information were more likely to scan foreign language material than respondents who made little or no use of historical information, but in the case of other types of information there was no relationship with the scanning of foreign language material (Table 220). A similar finding was apparent when the importance of historical data was related to scanning of foreign language material (Table 221). Respondents who judged this type of information to be very important for their research were more likely to scan foreign material than those who did not. Again, there was no relationship between the importance of other types of information and scanning of foreign materials.

Use of physical forms. The degree to which different physical

forms of information were used was related to the scanning of foreign materials (Table 222). There was a clear finding that respondents who made frequent use of formal methods for the transmission of information were more likely to scan foreign language material than respondents who made little or no use of formal methods. This relationship was particularly strong in the case of microfilms, maps, and films, but there was no relationship in the case of conference proceedings, research reports, newspapers, government publications, recordings, computer printouts, video-tape, or other pictorial representations.

In the case of informal communications, there was a definite tendency for respondents who frequently communicated with persons in their own institutions to scan literature in foreign languages less often than did respondents who made little or no use of personal contacts. However, this was not the case where personal contacts with colleagues in other institutions were concerned. No particular language was associated with these contacts.

Reference searching. There was no evidence to suggest that usefulness of various methods of finding references for research was related to the scanning of literature in foreign languages (Table 223). There was a tendency for researchers who found discussions with colleagues in their own institutions to be of use in tracing references to scan foreign material less than others did, but this tendency was not very pronounced, and in fact it was the only one apparent in this tabulation.

Use of libraries. Researchers who made use of more than one library were more likely to scan foreign material than were researchers who made use of more than one library (Table 224).

Importance of speed. Respondents who wanted to know about new publications very soon after publication were also more likely to scan foreign material than were researchers who were not so concerned with speedy notification of new publications (Table 225).

Current awareness. Respondents who used bibliographies and books to keep informed about current literature were less likely to scan foreign material than respondents who used conferences and conference proceedings for keeping informed (Table 226).

Method of dealing with material in a foreign language that researcher can read (Question 46). Respondents were asked to indicate if, when they came across a reference to an item in a foreign language they read which appeared to be relevant to their research, they had any reluctance to look up the original. About one third of respondents had no more reluctance to follow the original than if it were in English, about one third were slightly more reluctant, and one third were considerably more reluctant to look up the original of foreign publications (Table 228). Respondents from Oxbridge and the London colleges were more likely than respondents from other environments to state that foreign material gave them no trouble.

Respondents with a primary interest in psychology were reluctant to follow up material in a foreign language (Table 229), and this finding was in agreement with the previous data showing that psychologists were much less likely than other researchers to scan material in foreign languages.

Respondents who could read languages other than French and German were more likely to follow up material in these other languages than respondents who could read only French or German (Table 230) were to follow up material in French or German. It is suggested that the former were better linguists than those who claimed to know French and/or German only. The latter group probably learned their languages at school (and were considerably out of practice), while the former group may have been either nationals of other countries in the first instance, or may have learned their languages for a specific purpose after they had left school. It was the experience of the Experimental Information Officer at Bath that those who had to rely on "school French" or "school German" were less able to deal with material in these languages than were those who learned their French or German later on in life.

Method of dealing with material in languages not read (Question 47). Respondents were asked to indicate what they did when they came across a reference, other than an abstract, to an item which they believed to be relevant, but which was in a language they did not read. They were asked to indicate, separately, the method used to deal with material that was not easily accessible in the original.

When the original was easily accessible, the most popular method was to try and get the item translated, if the researcher believed it to be very important. If they did not believe it very important they usually got the gist of the article themselves, searched for a summary or an abstract, or ignored the item - in this order of preference. Where the original was not easily accessible, respondents were very likely to ignore the item, and they would get it translated only if it was judged to be very important (Table 231).

Researchers who could not read any foreign language were much less likely than others to follow up a foreign language reference when they came across one, even when the reference appeared to be important. Those who could read no foreign languages were nevertheless more likely to follow up a reference if the original was available locally than if it was not (Table 231).

Even those who stated that foreign language material was difficult to cope with were not significantly different from those who were proficient in foreign languages in their willingness to tackle an article in a language they did not know if it looked to be of importance to their work; they were, however, even more inclined to ignore a foreign language reference if it did not look important.

3.2.17 Effect of language considerations on choice of research topic and conduct of research

Choice of research topic (Question 48). It is clear from the results in 3.2.15 and 3.2.16 that language acts as a considerable barrier

to the free flow of information in the social sciences. Researchers with limited facilities for the translation of foreign material were both less likely than other researchers to expose themselves to foreign material, and, when exposed to foreign material of potential relevance, less likely to follow it up. In spite of this language barrier, the majority of researchers claimed not to have been influenced by language considerations in their choice of research topics (Table 233). Seventy-eight per cent of respondents stated that their original choice of research subject was not affected by the proportion of material they believed to be in English.

Researchers in psychology and statistics were less likely, and researchers in history more likely, than others to be influenced in their choice of research by language factors (Table 235). This finding confirms other findings reported here which have shown that psychologists make less use than other researchers of foreign language material, can read fewer languages, and scan less foreign language material. When psychology was given as a secondary research interest, it was also associated with little influence of language upon choice of research topic (Table 236). In the case of researchers in history, it is probably the nature of the material used in research that makes greater demands upon foreign language capability.

One or two interdisciplinary research areas were found to be a little different from the main social science disciplines (Tables 237-241). For example, researchers with a primary and a secondary research interest in economics were hardly influenced at all in their choice of research topic by language considerations. However, researchers with a primary research interest in history and a secondary research interest in economics (perhaps economic historians) were likely to be very much influenced in their choice of subject of research by language considerations; 60 per cent of this group said they were influenced by their knowledge of the amount of material in foreign languages that was potentially relevant to their research. Although the number of researchers in this group was extremely small (only 15) the direction of the relationship is unmistakeable. Geographers interested in economics were, like researchers with primary and secondary research interest in economics, largely unaffected by language considerations. In the case of psychology,

whether it was given as a primary or a secondary research interest, choice of research topic was largely unaffected by language considerations. Respondents with a primary interest in psychology and a secondary research interest in sociology were particularly uninfluenced in their choice of subject by language considerations. Only 3 per cent of this group were so affected, and this contrasts with an average of 23 per cent for all other groups based on disciplines. There were only 12 respondents with a primary research interest in history and a secondary research interest in sociology, and 58 per cent of this group stated that their subject of research was influenced by language considerations. There was a definite tendency where history was involved, either as a primary or as a secondary research interest, for respondents to be much more affected in their choice of research subject by language considerations than in other subjects.

There was a significant relationship (Table 242) between the effect of language on choice of research and status of researcher: research students were less likely than other respondents to be affected in choice of research by language, whereas research fellows and research assistants were more likely than others to take language into account when choosing research topics.

There was a slight indication (Table 243) that researchers who made frequent use of historical and descriptive data were more likely than others to be affected in choice of research subject by language considerations. This tendency was magnified when importance of historical and descriptive data was related to the effect of language on choice of research subject. Here researchers who rated historical and descriptive data as very important for their research were extremely likely to be influenced by language considerations.

Researchers who could read French exhibited the same characteristics as researchers who could read no languages at all in their choice of research topic, but researchers who could read German, and especially those who could read Russian, were more likely than those who could not to be influenced by language in choice of research subject (Table 245). This finding suggests that as capability in foreign languages increases, language considerations exert an increasing positive influence upon

choice of research topic. This tendency would also be in agreement with the finding that those who used historical and descriptive data frequently were more likely than those who did not to be influenced in choice of research topic by language considerations.

Conduct of research (Question 49). While over 75 per cent of respondents felt that their choice of topic had not been influenced by language considerations, a smaller majority (62 per cent) felt that the conduct of their research had been uninfluenced by language difficulties (Tables 246-253). Twenty-seven per cent of respondents said that the language problem had a small effect in this direction, 8 per cent said that it had a moderate effect and only 2 per cent indicated that the language problem had a substantial effect.

Respondents from the London colleges and Oxford and Cambridge universities were more likely than others to state that their research had been substantially affected by the language problem; respondents from colleges of education, research institutions, and government departments were more likely than other respondents to say that the language problem had no effect upon their research (Table 246). Status was largely unrelated to the degree to which research was affected by the language problem; it was noticeable that research students were more likely than other researchers to say that their research had been slightly affected by the language problem, but the relationship between status and language was not significant, and is not reported in detail.

Researchers in anthropology, geography, and statistics were much more likely than researchers in other subjects to be affected to some degree by language difficulties, and the constraints imposed by language problems upon research in anthropology were evidently severe (Table 247). Education was least affected by language difficulties. In the case of secondary research interests (Table 248) anthropology and geography were more affected by language problems than were other subjects, although in this case respondents with a secondary interest in statistics were no more likely to be affected by language problems than other respondents. Again, researchers in education were largely unaffected by language difficulties. When primary and secondary research interests were cross-tabulated in 3-way tables with data on the effects of language

upon conduct of research, one or two of the interdisciplinary areas of research stood apart from the main social science disciplines. Researchers with a primary research interest in history and a secondary interest in economics, having been affected considerably by languages considerations in their choice of research topics, were less likely than others to be affected in the conduct of their research by language problems (Tables 249 and 250).

Research of a theoretical nature was more likely to be affected by language problems than was research of an applied nature (Table 251).

Language was likely to exert its effect upon research to the same extent, irrespective of whether the language was French, German, Russian, or any of the other languages recorded (Table 252). Respondents who read no languages were very unlikely in the conduct of their research to be affected by language problems. This could of course be due to the fact that they chose subjects which did not require any amount of foreign material - on the other hand these respondents may have been less ambitious in covering their subjects than researchers able to cope with foreign languages.

Foreign language problems: conclusion

It is evident from the foregoing results that social scientists are not, by and large, either very well-equipped with language skills, or very aware of current literature in foreign languages. Only one-fifth of respondents could read both French and German - the two major languages of social science publications apart from English - and just under one-fifth disclaimed any knowledge of foreign languages at all. Of those who did read one or more foreign languages, only one-third regularly scanned foreign language material. There was also considerable reluctance to follow up foreign references: only one-third of respondents said they were no more reluctant to follow up a foreign language reference than an English language one.

It is noteworthy that when respondents were asked about problems of keeping up with research in progress, only 52 mentioned foreign research as a problem. In answer to the question about special information problems (Table 329) very few mentions were made of difficulties involving foreign language materials. Either the social scientist finds the foreign language question largely irrelevant to his research, or he rationalises his own linguistic inability into supposed irrelevance of foreign material. In economics, it is true, English has become virtually a lingua franca, but this cannot be said to be the case in sociology or political science. During one of the interviews a professor of sociology was quoted as saying:

> We do need a better translation service, especially for abstracts ... the language problem means that we have a view of French sociology which is twenty years out of date.

The relatively poor use of abstracting and indexing periodicals would mean that most researchers were underexposed to foreign language material in the first place. Secondly, all the abstracting and indexing periodicals that were used had a strong English language bias. For example, such comprehensive and important bibliographical tools as Bulletin Signalétique and Referativnyi Zhurnal were hardly ever mentioned (see 3.2.9). It may be that some kinds of social science research, especially applied research, do not travel well - what happens in Chinese prisons may be simply irrelevant to the British applied criminologist. On the other hand, there are small areas of research in the social sciences where material in foreign languages is essential, and this type of research is perhaps undertaken only by those who can read the relevant languages.

In the main, it seems that although most disciplines in the social sciences could make use of material written in foreign languages, researchers are prepared to accept a high degree of substitution in the material used. Researchers do not usually extend their requirements to foreign language material and hence are unlikely to say that their research was drastically influenced by language problems. In the case of respondents who read no foreign languages (and who did not therefore scan literature in foreign languages) it is difficult to get an estimate of need: these researchers were not really in a position to say what foreign

language material would be of use to them, except in the case of the occasional article which appears in translation. The same is also true of researchers who do not scan foreign language material (even though they can read foreign languages), although these researchers are potentially in a position to make judgement on the relevance of literature in foreign languages.

3.2.18 Stimulus for ideas (Question 54)

Respondents were asked to rate on 10-point scales the value of research, teaching, discussions with colleagues, reading, and conferences, according to their value as a stimulus or source of new ideas for their current research. Most respondents were able to comply with these instructions and rated each of these activities. Research and reading were rated as more valuable as a stimulus or source of new ideas than conferences. Discussions with colleagues were of some value; and respondents were about equally divided on the question of the value of teaching relative to the other activities.

Information may have a low factual content but a high stimulus value; and different kinds of information, and different media or channels, may be important for factual content and for stimulus. It was hoped that the data from this question would give some indication of whether or not informal contacts were more important than formal information-seeking activities as stimuli or sources or new ideas.

There were some environmental differences for answers to this question. These were in the main obvious differences and merely served to demonstrate the reliability and validity of the answers to different parts of the questionnaire which investigated the research and communication activities which respondents were asked to rate in question 54. For example, respondents from government departments and from research institutions outside universities, and also independent researchers, were much more likely than other respondents to rate teaching of no value as a source of stimulus for ideas in research: this result was to be expected, because these categories of researchers would undertake very little teaching, if any. However, researchers in relatively isolated

environments were likely to value discussions with colleagues much more than other researchers: independent researchers were more likely than others to find reading a source of stimulus (Table 298).

Ratings on this question about sources of new ideas were unrelated in the main to the status of researchers, although research students found less stimulus from teaching than did other respondents (Table 299). Sources for new ideas were unrelated to research experience or to area of research (Table 300). Respondents who had been in full-time research before 1956 were more likely than others to get ideas from teaching and from conferences, but this tendency was not very strong.

There was a relationship between sources of ideas and usefulness of physical forms. In the case of informal channels, those who used colleagues or conferences as sources of ideas were also likely, not surprisingly, to be the ones who noted that colleagues and conferences were of use in research (Table 301).

There was little relationship between the value of different sources for ideas and the number of conferences and types of conferences attended, apart from the obvious relationship that researchers who did not attend conferences did not find conferences a source of stimulus for ideas (Table 302). There was little relationship between sources of ideas and the type of material exchanged at conferences or the relevance to research of material gained at conferences. It was noted that respondents who judged material gained from conferences to be irrelevant were more likely than others to rate conferences as of no value as a stimulus or source of new ideas. This relationship need not necessarily have been the case, because material gained at conferences, although judged to be irrelevant for research, could perhaps have been of value as a source of stimulus for ideas.

There was no evidence to suggest that some types of information, or indeed some communication channels, fulfil a special role as a stimulus

or source of new ideas. Informal contacts, including those gained at conferences and discussions with colleagues, as well as the use of channels, were important for the content of the information that was transferred as well as for their value as a stimulus or source of new ideas.

From the data it was impossible to obtain a measure of the relative importance of sources for the transmission of information as such, as opposed to their value as a stimulus or source of new ideas.

3.2.19 Delegation of searching for references and willingness to use an information officer (Question 55 and 56)

Respondents were asked the extent to which they delegated their searching for references and material, and to what extent they would be prepared to use an information officer, if one were available. Seventy-two per cent did not delegate the searching of references at all, 21 per cent of respondents did so for part of their work, and only 7 per cent delegated work extensively.

Age. There was a clear relationship between the degree of delegation and age (Table 303). Older researchers were much more likely than younger researchers to delegate extensively their searching for references and materials.

Environment. There were significant differences in degree of delegation between different types of environment (Table 305). Members of non-university institutions and government departments were much more likely than other researchers to delegate searching for references. Respondents from the new universities were more likely to delegate searching for references than were respondents from the other universities. Respondents from the Scottish universities rarely delegated searching, and then only occasionally; those in colleges of education, and independent researchers, also delegated searching for references only occasionally.

Status of researchers. The relationship between status and delegation of reference searching (Table 307) is very strong indeed; there was a clear tendency for those of higher status to delegate more reference

searching. This was particularly clear for those with professorial rank, who were very much more likely than senior lecturers or readers to delegate a good deal of their searching. There was also a strong difference between researchers with reader or senior lecturer status and those of lower rank, while the difference between, for example, lecturer and assistant lecturer, or between assistant lecturer and research fellow, was small. Only 43 per cent of respondents with professorial status said that they never delegated searching for references, as against 72 per cent of all respondents. At the other extreme 91 per cent of research students said that they never delegated reference searching.

Although the variables of status and age were strongly related to delegation of searching, several other factors were also associated. These included length of service (Table 306), date of appointment to present rank (Table 308), and length of research experience (Table 309). There was a tendency for the older, more experienced, and therefore more senior respondents, to delegate more of their searching. Status in the research team itself was also associated with delegation of searching. Not surprisingly, directors of research were much more likely to leave reference-hunting to their juniors than were research fellows or assistants (Table 310).

Research interests. Except insofar as researchers in history and geography appeared to delegate searching less than researchers in other subjects, no strong relationship emerged between delegation and primary, or secondary, research interests. However the type of research undertaken seemed to have a more marked effect on degree of delegation. Table 311 shows that applied research was associated with a higher degree of delegation, and theoretical work with a lesser degree, than for other types of research.

Type of information. Heavy users of statistical material were more likely than respondents who made little or no use of this material to delegate searching for references (Table 312). Frequency of use of types of material (e.g. historical, conceptual) in research was unrelated to delegation of reference searching. When the importance of statistical material was related to delegation (Table 313), a similar relationship was seen: those who judged statistical material to be

of importance for their research were more likely than those who did not to delegate some reference searching. There was also a tendency for researchers who judged historical information to be important to delegate less than those who judged historical information to be of little or no importance for their research. It is likely that delegation of searching for statistical material is much easier than delegation of searching for other types of material.

When delegation of searching was tabulated against use of research materials (Table 314), two dissimilar patterns of behaviour emerged. Researchers who made little or no use of print-media such as periodicals, books, conference proceedings, and theses, were more likely to delegate searching than were those who used them heavily. This also applied to some of the bibliographical tools such as library catalogues, bibliographies, and references in books and periodicals. On the other hand, researchers who made frequent use of informal contacts (consulting experts, discussions with colleagues in own and other institutions, consulting librarians) were more likely to delegate reference searching than researchers who found these informal channels of little use.

There was evidence to suggest that delegation of reference searching was associated with greater activity than average in informal communication channels. Those who did not discuss their research with their colleagues in their own institution were less likely to delegate reference searching than those who did discuss their work (Table 315). This relationship was even stronger in the case of contacts with colleagues in other institutions; 91 per cent of those who had no such contacts never delegated searching. Researchers who were most active in exchange of manuscripts and offprints were more likely to delegate reference searching than those who communicated with external colleagues by personal contact only (Table 316).

Willingness to delegate searching for references to information officer (Question 56a).

Respondents were asked how far they would be prepared to delegate searching to a subject specialist with a detailed knowledge of bibliographies, abstracts and indexes, libraries, etc., if such a person was at hand.

The term "information officer" was not introduced because so few social scientists would have had experience of one at the time the questionnaire was circulated.

Only 12 per cent of respondents said that they would not delegate any reference searching to such a person, while the remainder of respondents were about equally divided as to the amount of delegation, and about half thought partial delegation would be successful. Where respondents considered they could not delegate reference searching, they were asked to give their reasons. These included: (a) no one else was competent to do the searching; (b) it was difficult to formulate precise instructions; (c) the serendipity value of searching was lost; (d) subject areas were small and delegation was unnecessary; (e) research students registered for higher degrees were not allowed to delegate searching. No other answers were given to this open-ended question.

Where research was applied or experimental researchers were more willing to delegate searching to an information officer than when research was theoretical or historical (Table 327). This may be related to the question of assessment, since in applied or experimental research it may be easier to judge the relevance of material, and therefore the probability of missing relevant material is smaller. The type of material required in theoretical or historical research may be less easy to identify and assess for relevance (Table 327).

Willingness to use an information officer was unrelated to age, and in the main to environment, although researchers from government departments nearly all said that they would use an information officer and, as seen from the interviews, many in fact did make use of such facilities (Table 317). It is interesting to see here (Tables 324 and 325) that status of a respondent was not related to his willingness to use an information officer. Those of professorial rank were no more willing to delegate searching to an information officer than were others; this contrasts markedly with the previous analysis where it was seen that respondents of professorial status did in fact delegate to a far greater extent than did other respondents. It can be concluded that although professors are not always willing to use an information officer they are willing to delegate searching to their own research assistants.

Whether or not a researcher would delegate searching to an information officer was largely unrelated to his research topic, although workers in education and sociology felt more able to delegate extensively. Researchers in history were less willing than others to delegate reference searching, and when they were willing, they thought that only part of their searching could be delegated. The reluctance of respondents involved in historical research to delegate searching was also apparent when primary and secondary interests were cross-tabulated against willingness to delegate searching (Table 319-323). For example, 37 per cent of respondents whose primary and secondary research interests were in economics said that they would delegate reference searching extensively, whereas only 19 per cent of respondents with a primary research interest in history and a secondary research interest in economics would do so. But this was not the case for respondents who gave economics as a primary research interest and history as a secondary research interest: these persons were as willing to delegate reference searching to an information officer as were mainstream economists. Researchers in education were slightly more willing than others to delegate reference searching to an information officer, but this was not the case with the respondents with a primary research interest in sociology and a secondary research interest in education.

Although there were no differences between full-time researchers and respondents who combined research with teaching in the degree to which they would be prepared to delegate reference searching taken across all disciplines, there were differences between disciplines within each of these sub-groups. Full-time researchers in geography and politics (as opposed to respondents who combined research with teaching) were less willing than respondents from other disciplines to delegate reference searching at all; and when political scientists were willing to delegate reference searching, they were much more likely to state than other respondents that only part of their searching could be delegated. This was also so for full-time researchers in anthropology. The same between discipline differences were not apparent in the case of respondents who combined teaching with research.

Researchers who found abstracting and indexing journals, consulting experts, discussions with colleagues (both in their own and other institutions), consulting librarians, and bibliographies or

references in books or periodicals, to be of use in tracking down references were more willing to delegate reference searching than respondents who found these methods of little or no use. On the other hand, researchers who found some of the formal bibliographical tools (library catalogues and specialist bibliographies) of use were on the whole no more willing than others to delegate reference searching. This was not, however, a negative relationship, and it does not therefore invalidate the previous findings.

There was a tendency for those respondents who made great demands upon speed of publication (and the speed with which abstracts appeared in secondary sources) to be more willing than others to delegate reference searching. Researchers in history made the least demands upon speed (see 3.2.13).

Comment and Conclusions. Although only 6 per cent of respondents made extensive use of other persons for information searching, the answers to the question about the use of an information officer obviously show that there was a good deal of enthusiasm for this idea, and that infrequent delegation practised at the time of answering the questionnaire was attributable to inexperience and lack of facilities, rather than to an outright rejection of the idea.

There was, however, consistency in answers to the questions dealing with actual behaviour and potential behaviour (if an information officer was available). 89 per cent of respondents would be willing to make use of an information officer, at least for some of their work. Of those respondents who would not be willing to use an information officer, 93 per cent did not delegate reference searching at the time of answering. Of those who would be willing to delegate part of their reference searching, 73 per cent did not do so at the time of answering the questionnaire; while of those who would be willing to delegate most of their reference searching, 61 per cent did not do so at the time of answering the questionnaire. Although the majority of researchers did not delegate reference searching (no doubt because they did not have the facilities and assistance for doing so), most of them expressed willingness to do so.

It was evident that status was one of the more important factors influencing the degree to which searching was delegated. Respondents of professorial rank (including directors of research teams) were much more likely to delegate searching than other respondents. Age, experience and length of service were all related to degree to which searching was delegated in a way which was consistent with the relationship between status and extent of delegation of searching.

Impressions gained from interviews suggested that many researchers were not prepared to delegate searching, even if they had the staff to do their searching for them, and 11 per cent of respondents did, in fact, say that they would not even let an information officer do their literature-searching, mainly because they trusted no one but themselves to do it thoroughly. As one respondent put it:

Highly motivated slaves are rare.

The number of respondents who were not prepared to delegate searching was enough to make one wonder whether many of the more senior respondents delegated searching out of necessity rather than choice. Perhaps the majority of researchers, independent of their status, would really prefer to do their own literature searches (possibly because of the problems of judging relevance of material), but under pressure (and provided with research assistance) find that they must delegate searching. When asked if they would be willing to use the services of an information officer, researchers may have expressed such a willingness, not because they wanted to give up searching, but because other pressures on their time made searches increasingly sketchy. In any case, when questions are asked about hypothetical services it must always be remembered that there can be quite a large discrepancy between what people say they would do, and what they would do, if the projected service were to materialise. With this proviso in mind, however, it was evident that the idea of an information officer was widely acceptable, even if it was faute de mieux.

There was a persistent tendency, though not a particularly strong one, for heavy users of bibliographical tools and the primary literature to be more willing than others to delegate reference searching. For

example, researchers who made heavy use of research reports, theses, and government publications were more willing to delegate reference searching than respondents who made little or no use of these materials and communication channels. Whether delegation produces more reference, and thus helps to account for heavy use, or whether heavy demands make users more ready to delegate, is an interesting question: probably there is an interaction, and both are true.

Willingness to use an information officer seemed to be largely unrelated to many other information seeking activities. Researchers in sociology and education were slightly more enthusiastic about such a service. The only group who emerged as definitely unwilling to delegate their searching activities were researchers in history. It may well be that they were right in their judgement, and that the researcher who works to a great extent with unpublished papers and archival material would have the greatest difficulty in specifying his needs precisely enough to ensure that a really thorough search was carried out by someone else. Researchers in history, however, account for only a small proportion of the social science users in the sample.

The Experimental Information Officer at Bath University noted that some clients were prepared to delegate reference searching only in areas of marginal interest; their primary research fields being apparently too important to be delegated to someone else. On the other hand another group of clients wanted the service to be concentrated in the area of their primary research interest, while confirming their own literature searching practices as before: in these cases there is no delegation as such, the information service being treated as a net to catch any references the individuals concerned may have missed themselves.

The Experimental Information Officer also obtained the impression that the lack of knowledge of how to go about a large scale retrospective search may have affected the attitude of clients towards the idea of an information officer. One client decided not to make use of the information service for current awareness searching; he regarded his own procedures as perfectly satisfactory, but was willing to delegate a retrospective search, because of an imperfect knowledge of the techniques involved.

Personality factors probably play a large part in the degree to which researchers would delegate literature searches, although the investigation of personality is outside the scope of the present survey. Perhaps the final word on delegation should be left to two respondents, one of whom was highly committed to the idea of assistance with searching, mechanised retrieval and the like, and the other who deplored the whole idea of intermediaries between himself and the information system:

> Facilities for information-seeking at the university compare very badly with those in research institutions. As a result, I am for getting out of university life and going back to full-time research!

> Much of my pleasure in research is gained from the search for the material. Last summer I covered about 500 miles ...

Information officers may be thought of merely as useful supplements to the system. However their potential role may be much more crucial than this. If the idea of an intermediary between the information system and the user became generally accepted, the information system could develop to a complexity that would be unthinkable if it had to be geared to direct use by researchers; indeed, even the present system can be made to work much better. The fact that the idea, untried though it is at present, is far from unacceptable may be one of the most significant findings of the Investigation.

3.2.20 Instances of late detection of information (Question 58)

Admission of late detection can indicate either conscientiousness or laziness on the part of researchers. The conscientious researcher, who hunts assiduously for information, is likely to come across so much information that some of it is almost bound to be late; if he had been less assiduous, the information would still have been there but might never have been known to him. At the other extreme, the more passive researcher, while likely to receive much less information altogether, is bound at times to come across it too late - he could have found it in time if he had been assiduous. In the first case, the system may be held largely to blame; in the second, the researcher can blame no one but himself.

Respondents were asked if they had ever come across information too late to be of maximum use to them, even though it existed before their research was underway or perhaps completed. Twenty-six per cent of respondents had never experienced this problem, 7 per cent had done so frequently, and 68 per cent occasionally. This question gives some idea of the cost to researchers of inefficiencies and inadequacies in the information system and in their own information-seeking activities. It is of course difficult to apportion the cause between the system and the user.

Respondents from colleges of education were less likely than others to experience this problem (Table 336), although it is doubtful if these researchers were any more industrious than others in seeking the information they required, or that they had available better information services. It is more likely that respondents from colleges of education were much less demanding, and therefore less rigorous in judgements of the relevance of material received. They did in fact have fewer information problems than researchers in other institutions (see 3.2.22). Respondents from Oxbridge, the London colleges, and the new universities were more likely than others to experience instances of late detection of information.

There was a definite tendency for more senior respondents to experience late detection more often than others. Thirty-six per cent of research students had never experienced an instance of late detection, as against only 20 per cent of respondents with the rank of professor or lecturer.

The relationship between instances of late detection of information and experience in research was a complex one (Table 338). If one takes first those respondents who started in research in 1962 or later, the more experienced tended to encounter late exposure more often than the less experienced, who, when they did encounter it, tended to do so only occasionally.

Instances of late detection of information were largely unrelated to the subject of research, although those in history experienced the problem less frequently than others. Where research was mainly of a

theoretical nature, instances of late detection occurred less frequently than average, although there were no other differences between types of research.

There was some evidence to suggest that instances of late detection were more frequent with statistical data than with other sorts of material (Table 340).

Heavy users of each of the physical forms experienced more difficulties relating to late detection than those who made little or no use of any particular physical form. In particular, the tendency was strong in the case of research reports, theses, newspapers, government publications and other official documents, and maps; the relationship also extended to the use of personal contacts and conferences in research but not to periodicals, monographs, conference proceedings, newspapers, and microfilms and microfiches. There was also evidence to show (Table 342) that researchers who found abstracting and indexing journals, specialist bibliographies, bibliographies and references in books and periodicals, and discussions and correspondence with persons in institutions elsewhere, as most useful in locating references were more likely to experience instances of late detection of information than those who found these sources of no use. Thus, again it was apparent that researchers who were more active in any one aspect of information seeking were more active in other aspects, and in this instance, to experience cases of late detection more often than those who were less active seekers. There was also some indication that respondents who used two or three abstracting and indexing journals were more likely to come across instances of late detection than those who used only one abstracting or indexing journal (Table 343).

The data in Table 344 suggest that the quality and coverage of local book-stocks are related in some way to the frequency of late detection. Where local book-stocks satisfied all requirements, researchers were less likely than average to come across instances of late detection.

There was little relationship between incidence of accidental discovery and frequency of late detection, but the relationships that

did appear were interesting (Table 345). Those who often experienced accidental discovery through wandering around book shops were much less likely than average to experience instances of late detection than others, perhaps because this activity made it more likely that relevant material would be picked up in time. On the other hand, researchers who picked up references by accident through the receipt of offprints were much more likely than average to experience instances of late detection. Perhaps those who went out and looked for information (e.g. in book shops) were likely to obtain material in time for inclusion in their current research, whereas those more passive researchers who waited for material to come to them were likely to find that it was a little late for inclusion in their current research when it did come.

Those who did not find it important for their current research to know very soon after publication about new material were less likely than researchers who were more demanding in this respect to experience late detection of information (Table 346).

Respondents who used conferences to keep up to date with current literature were more likely than others to experience instances of late detection, perhaps because conferences are usually held infrequently; there could be quite an interval between the appearance of a new publication and the time when it had filtered through informal contacts gained at conferences.

Researchers who were very demanding in the speed with which articles appeared in abstracting journals, and also researchers who were the least demanding (content to wait for over one year) were the users least likely to experience instances of late detection of information. It was the researchers who required articles to appear in the period from 1 to 12 months after the original publication, who experienced more instances of late detection than others. It is suggested that while this is an odd relationship, there is a satisfactory explanation. Perhaps those who demand very speedy notification are engaged in the sort of research where data must be hot off the press to be of value. A set of figures two years old is quite irrelevant to a statistician who is working on the frontiers of statistical prediction. Such data would in this case have lost their value completely, and there would be no point in

including them in the research even if this were possible. On the other hand, the researcher who makes no demands at all as far as speed of notification is concerned is probably working on a project where it is virtually impossible for information to be too late to include; for a historian spending ten years on a set of political manuscripts, a phrase like "late detection" can have hardly any meaning at all.

Respondents who did not try to keep informed of research in progress were less likely to experience instances of late detection (Table 347); this was another piece of evidence to suggest that the less active researcher was likely to have fewer conscious information problems than the more active, more demanding, and perhaps more conscientious researcher. Those who relied upon conferences and conference proceedings for keeping informed of research in progress were much more likely to experience instances of late detection than average. Again, as was the case in keeping up with current publications, conferences can have drawbacks as well as advantages. While conferences can be very valuable as a means of getting to know about new work prior to publication, excessive reliance on the conference as a means of information exchange can lead to slackness in the use of other channels. Table 350 shows that those who attended conferences were, in fact, more likely to experience late detection of information than were those who did not do so. As might be expected from this, those who found the information to be of central relevance were more likely to experience instances of late detection than those who found such information to be of marginal value to their research or of no use at all (Table 351). Those who delegated reference searching extensively were more likely to experience frequent instances of late detection rather than occasional ones, whereas those who only partially delegated reference searching were more likely to experience late detection only occasionally.

3.2.21 Accidental discovery of information relevant to research

Frequency of accidental discovery of material (Question 36a) It would appear from the replies to the questionnaire that social scientists discover relevant information accidentally in similar ways to those used by researchers in science. Open access book collections, which are the rule rather than the exception for a large proportion

of stocks of libraries in the U.K., make accidental discovery an easy and even pleasurable means of information retrieval for many researchers even though it was not the most frequent method mentioned by respondents. Future information systems design will almost certainly have to take account of browsing and serendipity as being part of the pattern of information behaviour in the social sciences.

Respondents were asked how often they had discovered material of relevance to current research by accident or purposeful browsing (Table 302A). There was a clear concentration on a few channels - scanning current periodicals, spotting a relevant reference at the time of looking up something else and conversations with colleagues being most important. Scanning current periodicals was the means by which accidental discoveries most frequently occurred. Forty six per cent often discovered material in periodicals, 44 per cent did so occasionally and only 10 per cent rarely or never. The second most frequent method was spotting relevant material when looking up something else; thirty eight per cent of respondents replied that they often made accidental discoveries in this way, 50 per cent occasionally and 12 per cent rarely or never. Current scanning and specific reference seeking revealed relevant material by accidental discoveries with similar frequencies.

Informal methods, particularly conversations with colleagues did not produce such frequent accidental discoveries as using the formal system; twenty five per cent often made accidental discoveries this way, just over half replied that it took place occasionally and twenty per cent rarely or never made accidental discoveries this way.

The frequency of accidental discovery by wandering through library stacks[1] is similar to that by conversations with colleagues; twenty per cent replied that it occurred often, half occasionally and thirty per cent rarely or never. In contrast, when this type of random browsing took place in bookshops only five per cent said that it often resulted in accidental discovery; and 61 per cent replied that it rarely or never took place. The receipt of offprints was only slightly more likely to result in accidental discoveries than browsing in bookshops; 55 per cent said that discoveries were rarely or never made in this fashion.

---

[1]The wording actually used in the questionnaire - "wandering along library shelves" - was unfortunate, but could hardly have been misunderstood.

"Other" methods appeared to account for very little accidental discovery.

Importance of accidentally discovered material (Question 36b) Respondents were asked whether the material accidentally discovered was of importance to their research. Accidental discoveries were rated by four categories of degree of importance and within each category the frequency of occurrence of discoveries of the particular degree of importance was recorded (Table 302B).

Sixty per cent of respondents replied that material not currently relevant but within their research interest was found often, 33 per cent said they found this type of material occasionally, and 6 per cent rarely or never. For those who found accidentally discovered material indirectly important (usually suggestive of a new approach or wider frame of reference), 31 per cent replied that this occurred often, 59 per cent occasionally and 10 per cent rarely or never.

Accidentally discovered material was sometimes marginally important to research, and when so considered, 41 per cent said this was often the case, 54 per cent occasionally and 4 per cent rarely or never. Of those who found accidentally discovered material directly important 34 per cent said this occurred often, 54 per cent occasionally and 12 per cent rarely or never.

When material found by accidental discovery was judged to be of importance often for current research, it was so judged by two-thirds of respondents to question 36b by way of being directly, marginally, or indirectly important (i.e. of some degree of importance for current use), and by one third of respondents as of general(but not current) relevance. The same was true when material discovered by accident was judged to be important occasionally - it was of current importance for two thirds of respondents.

The low ratios in Table 302B do not directly reveal these facts, but they are apparent when actual replies in the column are counted. The low percentage in the rarely or never category serves as a check; respondents positively considering accidentally discovered material of some importance would be unlikely to say that they rarely or never experienced finding it.

Comparing the replies to questions 36a and 36b on accidental discovery it is apparent that while the great majority of researchers sampled were able to answer the question on frequency of accidental discovery by different methods of discovery far fewer were able to indicate the importance of the material discovered.

However, it has been shown that those who did discover it and consider it of any importance tended to benefit by their discoveries; the phenomenon of accidental exposure to relevant information could be quite significant in the social sciences.

3.2.22 Special information problems (Question 57a)

Respondents were asked to indicate if they had information problems of special difficulty or importance during their current research, and if so to indicate briefly the nature of the problems.

Nearly half the respondents (47 per cent) experienced no serious information problem. In all, 17 special information problems were coded; there were also quite a number of other problems that occurred with a very low frequency and were included in an "other" category.

The most frequent information problems encountered were access to, and lack of, published and unpublished information. The other problems that were coded were mentioned by only a very small minority of respondents: they included problems relating to the confidentiality of data, non-comparability of statistical material, difficulties of maintaining personal contacts, the uncooperative nature of other researchers and government departments, difficulties with computing and data processing, methodological difficulties, poor library facilities, language problems (including difficulties of keeping up-to-date with foreign research), and problems of access to materials published in other countries (Table 329).

Enquiries about information problems bring into focus the question of information use versus information need. It may be suspected that a number of respondents who said that they had no information problem would have replied in the affirmative if they had been questioned more deeply. This was the case in the interviews; superficial enquiries suggested that interviewees had no difficulties, but upon further probing, illustrated with examples of problems that can be met in information

searching and retrieval, a number of respondents agreed that there was indeed a problem. The questionnaire method is of course only one, very imperfect, way to study problems about lack of published or unpublished information; these categories may have been inflated because respondents mistakenly believed information to be non-existent after having carried out an unsuccessful search, when in fact it was available but they did not know how to retrieve it. Here current awareness services, and better facilities for browsing and scanning large amounts of material would be helpful, as would properly trained information officers.

Environment. Respondents from London colleges and redbrick universities experienced less difficulty than others in gaining physical access to published information; those in London also found access to unpublished information easier. Oxbridge respondents were a little more likely than others to experience difficulty in obtaining access to published information; one of two respondents from Oxford said in interview that although library stocks at Oxford were perhaps the best in the country, day-to-day work which required frequent access to material was made difficult in Oxford because of the scatter of published materials across several libraries. The few independent researchers in the sample found access to both published and unpublished material difficult, and this, together with material published abroad, accounted for all their information problems; this may not, however, be truly representative of independent researchers generally. The only other noticeable variation in the tabulation of special information problems against environment (Table 330) was that researchers from government departments were very often aware of material published abroad and were much more likely to mention this as an information problem than other respondents. This finding confirms impressions gained from the interviews, where government social scientists, and in particular economists, nearly always mentioned that a good deal of relevant material existed abroad and that getting to know about it, getting hold of it, and getting a translation where necessary, presented difficulties. It is possible that members of government departments are simply more aware of foreign research than are others, though it is hard to explain why they should be.

Respondents from colleges of education were less likely than others to mention information problems: and in spite of the inadequate research facilities available at most college of education libraries, they were, surprisingly, much less likely to mention problems of access to published

information than were other respondents. It must be concluded that the information demands of lecturers in colleges of education are not all that great, or, if demands are great by their own standards, then they are ignorant of vast amounts of material that could be relevant to their work. Research in colleges of education is really only in its infancy, and this may be reflected in the library facilities and services available. In the past colleges of education have been very much vocation orientated, and practical work has been emphasized to the detriment of research.

Subject of research. Data in Table 331 show that information problems varied considerably from one discipline to another. Researchers in psychology and statistics had fewer information problems than others, and researchers in geography were more likely than others to mention difficulties. These variations can hardly be attributed to differences between bibliographical tools in the various disciplines. It is not at present possible to make a comparison between the coverage of, for example, Psychological Abstracts and Geographical Abstracts, but the impressionistic evidence suggests that these two disciplines are served fairly well by bibliographical tools. It has already been seen that the geographers in the sample were comparatively heavy users of material published before 1900 (and, naturally enough, of maps), while the psychologists tended to use relatively little material published before 1918 (Table 151). Geographers therefore use material which is not easily retrieved by means of the usual bibliographical tools.[1]

When given as a secondary research interest, psychology was again associated with a smaller number of respondents than average mentioning information problems, as was education (Table 332). Those with a secondary interest in history were particularly troubled by problems of physical access to, and lack of, both published and unpublished information. There was a tendency for researchers with a secondary interest in political science to mention a variety of information problems, as was the case with researchers with a primary interest in political science, and researchers with a secondary interest in sociology.

---

[1] Geomorphological Abstracts (continued with extended coverage as Geographical Abstracts) did not start publication until 1960, while Psychological Abstracts was first published in 1927.

Researchers working in the areas of international, financial, and historical research mentioned more information problems than other respondents. Researchers concerned with theoretical research mentioned the least number of special information problems; this was expected, and confirmed impressions gained in interviews.

Research in the applied field was particularly associated with difficulty of access to unpublished information, confidentiality of data, and problems in the comparability of statistics from different sources. Researchers in the area classified as financial research were more likely to come across problems of access to unpublished information and a lack of published information than other researchers. Researchers working on international or comparative topics found access to material published abroad a special problem, as well as lack of published information.

There was a clear indication (Table 333) that respondents who made no use of historical, descriptive, statistical and methodological materials mentioned fewer special information problems than researchers who made moderate or heavy use of these information types. A similar pattern was seen when importance of information types was related to special information problems; those who regarded historical data as very important found lack of published and unpublished information a problem.

Physical forms. The number and type of special information problems experienced were largely unrelated to the frequency with which the conventional print-media materials were used. In the case of newspapers, government publications and other official documents, and also in the case of microfilms and microfiche, maps, and films, heavy users were likely to experience more information problems than those who used these materials lightly or not at all. Respondents who used conferences and contacts with colleagues were also more likely to have special information problems than those who did not use these channels of communication.

More evidence to suggest that special information problems were related to the less common types of material can be found in the fact that heavy users of microfilms and microfiches were more likely to mention access to both published and unpublished information as a

special problem. Heavy users of maps also mentioned the problem of access to unpublished information; they may have had in mind unpublished maps (such as those produced in local authority planning departments), or, more probably, unpublished statistical data.

Respondents who judged as most useful, library catalogues, bibliographies, and references in books and periodicals, who frequently searched library shelves in outside institutions, and consulted librarians for locating references were more likely to experience special information problems than researchers who made no use of these methods of locating references. There was no relation between judged usefulness of discussions with local colleagues and searching the library shelves of their own institution. This again suggests that those researchers who were most active, both in libraries and with other colleagues (in this case extending their reference searching outside their own institutions) were more likely to come across information problems than researchers who were less active and restricted their reference searching to their own institutions (Table 334). In this case, it may have been the problems themselves that prompted much of the information-seeking activities.

Solution of information problems (Question 57c). Respondents were asked to state the extent to which their information problems had been solved. Four degrees of solution of information problems were distinguished from replies to question 57c: (a) full and satisfactory information supplied as quickly as needed - only 3 per cent of respondents found this to be the case; (b) full satisfaction, but less quickly than desired (8 per cent); (c) partial solution, irrespective of speed (57 per cent); (d) no solution at all (22 per cent).

Thus there is certainly a deficiency somewhere in the system, on the part either of researchers or of information systems, or both, when only 11 per cent of special information problems are fully solved. A rough estimate of the number of unsolved problems can be gained from the fact that 366 respondents were included in Table 335; if each of these respondents had only one information problem then only 40 problems out of a possible total of 366 would be solved. This leaves a rather large figure of at least 346 information problems partly or wholly unsatisfied. On the other hand, only about half of the respondents mentioned information problems, and the answers were fairly evenly distributed across a large number of difficulties.

In conclusion, however, it must be pointed out that the questionnaire is probably a very imperfect instrument for the probing of information problems. It has been emphasized throughout this report that the researcher can often reshape his research when he meets a difficulty, in order to circumvent it. How many of those who claimed that they had no problems had made such a change of direction in the past we do not know; indeed, the effect of information systems on the conduct of research is a highly important and almost unexplored area.

3.3 Informal communications

Section 3.2 dealt with the information requirements for research, and concentrated mainly upon the requirements for literature, and the use of bibliographical tools. Section 3.4 will deal with the formal information requirements for teaching. The present section is set apart, because it deals mainly with the use made of informal channels of communication, and only indirectly with the information that is required and the information that is transferred through these channels.

There is now no doubt that informal communications play a very important part in the transmission of information in research communities.[1] The informal channels of communication do not always function in the direct transmission of information, but play an important part in motivating researchers, as an alerting process, etc.[2] In addition to these characteristics of the informal system, the other obvious attractions are speed of transmission, and currency of the information that is transmitted.

In addition to the section in the questionnaire which dealt specifically with the informal contacts, a number of other parts of the questionnaire dealt with contacts that researchers had with persons in their own and other institutions, and with attendance at national and international conferences. For example, in the question dealing with

---

[1] See, for example, Allen (1967), Allen and Cohen (1969), Menzel (1968), Pelz (1956), Orr, Coyl and Leeds (1964); and for studies of informal communications amongst social scientists see, for example, American Psychological Association (1963--), United States National Research Council Committee on Information in the Behavioral Sciences (1967) and A.G. Smith (1966).

[2] See Menzel (1968) for a discussion of the characteristics of informal systems, and the advantages of informal systems.

the use of physical forms (section 3.2.5) respondents were asked to rate the extent to which they used conferences and colleagues during their research. It was found that these informal channels were rated as very important and in some cases more important than some of the newer formal channels (for example, videotape). In the section (3.2.6) dealing with methods of locating references for research, colleagues, conferences, and consultations with experts were included and judged to be important. Respondents when asked about keeping abreast of new publications (3.2.13), and also about keeping track of current research in progress (3.2.14), however, mentioned that conferences played a negligible part when compared with formal channels for the transmission of information.

It was difficult to assess the relative importance of the formal and informal channels of communication in the dissemination of information. In some of the questions mentioned above (e.g. use of physical forms) assessments were made of the use of formal and informal methods in order to allow for direct comparison. It was found that the vast majority (90 per cent) of respondents discussed their work with colleagues in their own institution, and 93 per cent of respondents had some form of communication with persons in external institutions. Fifty-eight per cent of respondents had attended conferences in the last twelve months.

More details about discussions with colleagues, experts, and attendance at conferences are given below.

3.3.1 Discussion with colleagues (Question 50)

Although the majority of respondents did discuss their work with colleagues this activity was largely unrelated to other aspects of information gathering behaviour or to the background variables of researchers. For example, discussion with colleagues was largely unrelated to the age or status of respondents, length of time they had been in the institution, research experience, whether they combined research with teaching or were engaged full-time on research. Also, communications with colleagues were largely unrelated to primary research interest or to type of research (e.g. methodological, statistical,

applied).

However, discussion with colleagues was related to environment (Table 254) because respondents from government departments were more likely to discuss research with their colleagues than were other respondents, and those from colleges of education were less likely than other respondents to do so.

There was a definite tendency for discussions with colleagues to increase as the size of the research team increased. This relationship was statistically significant (Table 255).

Discussion with colleagues was almost totally unrelated to the use of formal channels of communications. For example, discussion with colleagues was unrelated to the type of information used, the frequency with which it was used, and to the judged importance of different types of information. It was also largely unrelated to the frequency of use of periodicals, books, bibliographies, abstracting journals, etc., to the particular physical format used, and to the formal methods of searching for references (Table 257).

In the main, whether or not a respondent discussed his work with a colleague was unrelated to the number of abstracting journals used in research, to the delay tolerable in appearance of publications in secondary sources, to methods of keeping informed about current publications, and to methods of keeping track of current research.

Respondents who judged as useful discussions with colleagues for finding references for research (data from question 20) were much more likely than those respondents who did not find colleagues useful for locating references, to give a positive answer to question 50 which asked about discussion with colleagues in general. This relationship gave an indication of the reliability of answers to the questionnaire: for example, 13 per cent of respondents did not find discussion with colleagues useful in obtaining references, and 10 per cent did not discuss their work at all with colleagues. Evidently, when discussions with colleagues took place, the exchange of references was a frequent occurrence. This view was confirmed by the experience of the Experimental Information Officer at Bath.

When discussions with colleagues were about the same research project the exchange of references often resulted from such contacts. However, conversation about work amongst people in the same disciplines, or amongst social scientists from different disciplines, or even amongst social scientists and non-social scientists involved progressively fewer exchanges of references relevant to research. It was also observed in this experimental situation that the flow of references was equally distributed from junior to senior members of the research and teaching community and vice versa: professors were seen as sources for references on certain topics by junior lecturers, and the latter often supplied references to their superiors.

Contact with colleagues in external institutions (Question 51a). Only 7 per cent of respondents made no attempt to keep in touch with colleagues in other institutions. Communication by correspondence and social contacts (e.g. personal visits, telephone conversations, etc.) were mentioned about twice as frequently as communication by exchange of offprints and circulation of unpublished manuscripts. Researchers in anthropology, geography, psychology and statistics and mathematics were a little more likely than others to exchange offprints. Respondents from colleges of education were much less likely to interact with colleagues in other institutions than were other respondents. The frequency with which offprints were exchanged and unpublished manuscripts circulated by college of education respondents was about half that of other respondents (Table 368). They did not differ with respect to communication by correspondence or social contacts. There was a clear-cut tendency for respondents with more experience in research to exchange more offprints than researchers with less experience, although research experience was not so clearly related to circulation of unpublished manuscripts (those with about 10 years' research experience were more likely to circulate manuscripts than those with greater or less experience), and research experience was unrelated to the frequency with which respondents kept in touch with colleagues by correspondence and informal contacts.

In the main, communication with external colleagues was unrelated to the age of respondents (although respondents in the older age groups were slightly more likely to exchange offprints than younger respondents)

and to the length of time in employing institution (Table 260). Respondents with professorial status were more likely to exchange offprints than were other respondents (Table 259). Research students were as likely as other respondents to make contact with external colleagues, but they were much less likely than other respondents to exchange offprints or circulate unpublished manuscripts (Table 259).

Only one client of the Experimental Information Officer at Bath attached great importance to the exchange of offprints. This client spoke of an "offprint swapping club", worldwide in its scope, operating in experimental psychology, and of the problem of breaking into it.

Contacts with external colleagues were largely unrelated to type of research (e.g. theoretical, applied, statistical), or to the number of persons in a research team (Table 261), although lone workers were slightly less likely to communicate with external colleagues than were researchers working in a research team. Contacts with external colleagues were also unrelated to marginal discipline and to the frequency of use, and importance, of types of information (Tables 262 and 263). There was one exception: researchers who made no use of either statistical or methodological materials were less likely than other respondents to keep in touch with external colleagues, and this was true also of respondents who rated statistical and conceptual material of little or no importance to their research (Table 262).

The judged usefulness of formal methods of locating references was largely unrelated to methods of keeping in touch with colleagues in other institutions (Table 265).

There was no relationship between keeping in touch with external colleagues and number of abstracting journals used in research, but there was a slight relationship between estimated importance of knowing about current research soon after publication and keeping in touch with external colleagues (Table 266). Respondents who rated early knowledge of current research as not very important were unlikely to maintain contact with external colleagues by the exchange of offprints and circu-

lation of unpublished manuscripts, although they were just as likely as other respondents to communicate by correspondence, personal visits, and telephone calls. However, respondents who rated early knowledge of current research as not very important made fewer external communications than other respondents.

Turning to the problem of keeping informed about research in progress, respondents who made no attempt to do so were less likely than others to keep in touch with external colleagues; this applied to all methods of keeping in touch with colleagues. Respondents who used conferences/conference proceedings and personal contacts to keep informed about research in progress nearly always kept in touch with external colleagues (Table 268).

Respondents who discussed their work with colleagues in their own institution did not necessarily maintain contacts with external colleagues, and vice versa (Table 269). Seven per cent of respondents who said that they discussed their work with colleagues in their own institution did not maintain contact with external colleagues, and 15 per cent who did not discuss their work with colleagues in their own institution maintained no external contacts with colleagues. Thus, there were 26 respondents who had no contacts either with internal or external colleagues, and 118 who maintained contact with internal but not external colleagues.

3.3.2 Attendance at conferences (Questions 52 and 53)

Respondents were asked to state the conferences attended during the previous twelve months. For respondents who had attended, they were asked to state how they picked up information (if in fact they did), and whether it was of central or peripheral relevance to their research. The findings from these questions must be read cautiously: the number of conferences attended in one year is usually quite small (when compared, for example, with number of visits to a library) and some disciplines may have had more conferences, by chance, in a twelve-month period than others. It is therefore unsafe to generalize about conference goers and non-

conference goers.

Thirty-two per cent of respondents had attended no conferences during the last twelve months. National conferences were attended much more often than international conferences, although the number of mentions of international conferences was appreciable (in fact, 16 per cent of responses). These data are reported in Tables 270 to 291. During the previous twelve months respondents were about twice as likely to attend one national conference as two, and about twice as likely to attend two national conferences as three.

There was a tendency for older respondents to have attended more conferences during the previous twelve months than younger respondents (Table 270); whereas 43 per cent of respondents in the 21-30 age group said they had attended no conference, only 20 per cent in the age group of 51 and over had not attended a conference during the preceding twelve months.

Respondents from the London colleges, the new, technological and Scottish universities were more likely than others to have attended a conference during the preceding twelve months. Respondents from Oxbridge, government departments and colleges of education were less likely than average to have attended a conference. Very few respondents from government departments had attended more than one conference during the year (Table 271).

There was a clear-cut relationship between conference attendance and status (Table 273). Research students, and research assistants to a lesser extent, were much less likely to attend conferences than respondents with lecturer or professorial status. Respondents with professorial status were much more likely than anyone else to attend conferences - only 15 per cent of them had not attended a conference, while as many as 60 per cent of research students had not attended a conference.

Researchers in political science were much less likely than other respondents to attend national conferences (although their attendance at international conferences was about average).

Geographers and psychologists were more likely than average to attend conferences, and sociologists and researchers in history were less likely than average to do so (Table 274). Psychology, geography, and education (as secondary research interests) were associated with a greater than average attendance at conferences, and political science (as a secondary research interest) was associated with a less than average attendance (Table 275).

Attendance at conferences was largely unrelated to type of research. Lone researchers were less likely than researchers working in a research team to attend conferences (Table 284). Principal investigators were more likely to attend conferences than their staff, and research students were much less likely to attend conferences (Table 285). Researchers who had a marginal interest in literature and philosophy were less likely to attend conferences than average, and respondents with a marginal interest in education, biology, and science were more likely than average to attend conferences (Table 286). Attendance at conferences was unrelated to the number of marginal disciplines cited.

There was a tendency for researchers who frequently used statistical, conceptual, and methodological material to be more likely to attend conferences than researchers who made infrequent or no use of these materials. This was not the case for the relationship between frequency of use of descriptive and historical data and conference attendance (Table 287). This same pattern was apparent when importance of statistical, conceptual, and methodological materials were related to conference attendance (Table 288).

Attendance at conferences was unrelated to the frequency with which periodicals, books, research reports, theses, and other formal types of documentation were used (Table 289) but attendance at conferences (as indicated by answers to Question 52) was related to the use made in research of conferences and colleagues (as indicated by answers to Question 17).

Respondents who used abstracting journals, experts, discussions with colleagues in own institution and elsewhere, specialist bibliographies, bibliographies or references in books and periodicals, and book

reviews were more likely to attend conferences than respondents who did not use these methods for locating references. The one exception to this general trend was in the case of library catalogues, where those who traced references by this method were less likely to make use of conferences than those who made no use of library catalogues. There was no relationship between attendance at conferences and the frequency with which references were obtained by searching through library shelves, either in a researcher's own institution or in another institution.

Respondents who made use of professional societies for keeping informed about current literature were more likely than other respondents to attend conferences (Table 290). There was a similar picture in Table 291 where method of keeping track of current research was related to attendance of conferences: respondents who made use of professional societies were more likely than respondents who did not do so to attend conferences.

Conference attendance was largely unrelated to whether or not a researcher discussed his work with colleagues in his own institution, but was quite strongly related to the extent to which a researcher kept in touch with colleagues in other institutions. Those who did not do so were unlikely to attend conferences. Respondents who kept in touch with colleagues in other institutions by the exchange of offprints were much more likely to attend conferences than those who kept in touch with external colleagues by correspondence or personal visits or telephone calls.

Value of conferences. Information gained at conferences was usually of some use to a researcher, but it was much more likely to be of marginal relevance rather than of central relevance. Only in a very few cases was information gained at conferences likely to be of no use at all. Information at conferences was as likely to be transferred by formal papers as by discussion.

Researchers in history were more likely than others to get useful information from conferences, and researchers in sociology were more likely than average to find that conferences produced no useful information. Researchers in psychology were more likely than others to come by information at conferences by the exchange of formal papers.

Researchers working by themselves and those working with one other person were more likely to find information gained from conferences of use compared with researchers who came from larger research teams (Table 292).

In the main, the value of material gained from conferences was unrelated to age of respondents, environments from which they came, length of experience in their present occupation and their status, secondary research interests, and status in research teams.

The value of conferences was largely unrelated to marginal disciplines cited, number of marginal disciplines cited, frequency of use of types of information, importance of information types in research, use of physical forms of material, and methods used for discovering references for keeping informed about current literature or keeping track of current research.

The majority of respondents, as has already been noted, discussed their work with their colleagues in their own institution, and this was largely unrelated to the value of material gained at conferences and the methods by which it was gained (Table 295), with the exception that respondents who did not discuss their work with their colleagues were twice as likely as those who did, to find material gained from conferences irrelevant. Where a respondent had no personal contact with persons or colleagues in other institutions a similar trend was seen: that is, these respondents were less likely than others to find material gained at conferences relevant or even of peripheral relevance to their research. When they did come across information at conferences, it was more likely to come from the papers read rather than from discussion or informal contact with delegates or speakers.

A number of clients of the Experimental Information Officer at Bath

mentioned that the true value of conferences as regards information gain was long term rather than immediate, and often took the form of references obtained, perhaps years later, from individuals befriended at conferences.

There was a slight tendency (Table 297) for researchers who attended only one conference to find material gained at conferences more relevant to research than those who attended two or more conferences.

3.3.3 Informal communications: conclusions

The vast majority of respondents discussed their work with colleagues both in their own and in other institutions. Communications with external colleagues were much more likely to take place by telephone and personal correspondence than by exchange of offprints or unpublished manuscripts.

Sixty-eight per cent of respondents had attended a national conference during the last twelve months. The extent to which conferences were attended was related to environment and status of respondents. Information gained at conferences was much more likely to be of marginal relevance than of central relevance. Information at conferences was as likely to be transferred by formal papers as by personal contacts.

3.4 Information requirements in teaching

The second part of the questionnaire related to information needs that arose in the course of teaching. The aim of this section of the questionnaire was to study the relationship, if any, between research and teaching needs, and ways in which information gained in one activity might be of use in the other. It was also thought that for some university staff teaching might generate more information needs than research, or that the needs might be quite different. At any rate, information needs generated by teaching seemed of sufficient importance and interest in their own right for supplementary data on them to be

worth collecting. Finally, however carefully the sampling was restricted to likely researchers, it was bound to include some who were not researching at the time.

This part of the report considers only teachers in higher or further education. The sample included 18 schoolteachers who were registered for higher degrees, but these are not discussed here.

This section referred specifically to the information needed in order to teach students. No question was included about materials needed as teaching tools in the classroom, but some respondents may have understood the question in this sense.

3.4.1 Nature of sample

Number of respondents. Six hundred and fifty respondents were involved in both teaching and research, and 278 were engaged in research only. Although the sample did not deliberately include anyone who was engaged only in teaching, there were in the event 149 in this category: that is, they had engaged in no research in the six-month period before filling in the questionnaire. Researchers in anthropology were less likely to teach than other respondents, but otherwise there were no differences between disciplines.

Qualifications. There was a close relationship between subject of qualification and subject taught (this was demonstrated by the percentages falling along the diagonal in Table 352). On average more than half of the respondents with a qualification in any given subject were teaching in this subject only. For example, 60 per cent of those respondents with a qualification in psychology taught psychology, 66 per cent with a qualification in sociology taught sociology, and so on. Those with qualifications in anthropology, education, or political science, were

less likely than average to teach their own subject. For example, respondents with a qualification in education often taught psychology; respondents with a qualification in politics often taught sociology; and respondents with a qualification in statistics or mathematics frequently taught economics. Geography was almost invariably taught by graduates in that subject.

Respondents teaching geography were much more likely to have a PhD than respondents teaching any other subject, while those teaching education were less likely than others to have this qualification. Proportionally, respondents teaching economics were less likely than others to have a PhD, but slightly more likely to have a Master's or Bachelor's degree. Researchers teaching psychology were much more likely than others to have a professional qualification combined with their degree, usually having also a higher degree; on the other hand, economists were very unlikely to have a professional qualification. Teachers of education were more likely than others to have a professional qualification combined with their degree; to a slightly smaller extent, this was so in the case of teachers of sociology. There were 10 respondents teaching education who had no degree and a professional qualification only, but this was rarely the case with other subjects (Table 353).

3.4.2 Research interests and subject taught (Question 61)

There was a close relationship between subject of primary research and subject taught (Table 354). Those with primary interests in economics, geography, politics, psychology and sociology were very likely to be teaching their research subject. Anthropologists were more likely to teach anthropology than respondents with no qualification in anthropology, but in both cases qualifications or research experience in anthropology were also associated with sociology as a teaching subject. Researchers in education also taught psychology, and to a lesser extent, arts subjects. Thirty-two per cent of researchers in sociology were distributed across all the other disciplines taught in the social sciences. Respondents with a research interest in history often taught political science, economic history and other arts subjects. Researchers in statistics very often taught economics. There was also a relationship between subject taught and secondary research interest

(Table 355), although, as might be expected, it was nowhere near as strong as that between primary research interest and subject taught.

3.4.3 Teaching load (Question 62)

Twenty-one per cent of respondents who taught estimated their teaching load at 12 or more hours per week. Fourteen per cent taught for 10 hours per week, and the same percentage for 8 hours per week.

Respondents teaching economics, psychology and statistics had a much lighter teaching load than others. Respondents in anthropology and education had a particularly heavy one (Table 357). The heavy load for anthropologists was due, no doubt, to the large number of research students in the sample with a primary interest in anthropology, because research students had a heavier teaching load than any other group of respondents (Table 357). Researchers in applied fields had a rather lighter load than others.

3.4.4 Usefulness of physical forms (Question 63)

Respondents were asked to indicate the usefulness of periodicals, books, research reports, computer printouts, and the like for teaching, as they had previously been asked to indicate the use of these for research.

Nearly all respondents used periodicals and monographs for teaching purposes, as they did for research. Only 3 per cent said that they did not do so, but as suggested in earlier sections of this report, a figure as small as this may well represent an error category, and this can probably be discounted. When judged usefulness of physical forms for teaching and frequency of use for research were compared (Table 359), it was evident that periodicals and books were judged most useful (rather than least useful or moderately useful) for teaching more often than they were "often" used (the equivalent category in the case of use for research) for research. The same was true of collections of readings and conference proceedings. Research reports and theses were not used so often for teaching as for research (this is hardly surprising, as these materials are strictly research products), and they were more likely to be judged "least useful" rather than "moderately" or "most" useful.

"New media" tended to be used much more often for teaching than for research purposes. Recorded sound, film, video-tape, radio, and TV were all regarded primarily as teaching tools. This was to be expected, as there has been a growth of interest in the use of new media in teaching, reflected in the establishment of Educational Technology Units at a number of universities and similar developments in colleges.

Not surprisingly, computer printouts were found to be of little use for teaching: 80 per cent of respondents did not find them useful for teaching (compared with 62 per cent of respondents who did not use them for research purposes).

Age bore some relationship to judged usefulness of physical forms, but only a very small one. Respondents from the youngest age group were slightly less likely than others to use research reports and theses for teaching, and those from the fifty-plus age group were more likely than others to use government publications and other official documents frequently. Films, and other pictorial media, as well as sound recordings and video-tape, were likely to be used a little more often by the older teachers than the younger ones; this is surprising in view of the fairly recent development of non-book media, but it may be that senior teachers have readier access to expensive equipment. Older respondents also relied more on radio and TV, colleagues, and external contacts. Colleagues in the teacher's own institution were, however, just as important for the younger as for the older teacher.

There were also one or two environmental differences, but again these were small. Respondents from colleges of education tended to find nearly all of the physical forms of more use for teaching than did other respondents. For example, respondents from colleges of education rated periodicals, theses, newspapers, government publications and other official documents, maps, films, and video-tape to be of more use for teaching than did others. They also rated colleagues and conferences higher than other respondents (Table 360).

Respondents from Oxbridge were particularly likely to find the newer media (films, video-tape, etc.) to be of little or no use for teaching; they also rated radio and TV, conferences and contacts with colleagues in

other institutions as of less than average use in teaching. This may be adherence to tradition, or lack of exposure to new media.

The usefulness of physical forms for teaching was not clearly related to the lecturer's status, but in any case relationships can be examined only over a restricted range, as very few research fellows, assistants or students answered the teaching section of the questionnaire. All that can be said, therefore, is that between the levels of professor, reader/senior lecturer, lecturer, and assistant lecturer, no differences were apparent in the judged usefulness of different physical forms of information for teaching.

Although periodicals and books, collections of readings, research reports and theses were used by the majority of respondents for teaching, other media such as newspapers, government publications, microforms, maps, films and the like, were used much less frequently: this is similar to the pattern for research, and reflects in great part the much smaller amount of material in these categories. But superimposed upon this pattern was another which was particularly evident in the case of the less frequently used forms; those who used reports, theses, newspapers, government publications, etc., for research were more likely than average to use them for teaching.

One or two examples will make this relationship clear. For teaching purposes, 31 per cent of respondents said that newspapers were not useful, and only 12 per cent judged newspapers often useful. But of those who used newspapers frequently in research, only 18 per cent said that they did not use newspapers for teaching, and 22 per cent judged them often useful for this purpose (Table 367). This type of relationship was apparent in the case of research reports, government publications, and microcopies. In the case of the less used media (maps, films, sound recordings and video-tape) the discrepancy between the average use of these forms and the use in teaching made by respondents who used them frequently in research is great. For example, only 27 per cent of all

respondents used films in teaching, but of those who used films for research, 75 per cent judged them very useful in teaching.

A similar pattern was seen in the case of the more frequently used physical forms; even in the case of periodicals and books, which nearly all researchers and teachers used, there was still a tendency for those who used them very frequently in research to be more likely than average to judge them useful for teaching.

From these findings it would be expected that when the judged usefulness of physical forms for teaching was tabulated against subjects taught, the same patterns would be exhibited as when the use of forms for research was tabulated against subjects of research. Reference to Table 374 shows that this is, in fact, the case.

Respondents teaching psychology were more likely to use research reports than were those teaching other subjects, and they made less than average use of newspapers, maps, and films. Respondents in education also made greater than average use of research reports in teaching, and they were more likely to use the newer media (films, other pictorial material, and tape-recordings) than were any other respondents. In the teaching of science subjects films were also used a good deal, and to a slightly lesser extent in psychology (perhaps this is accounted for by the educational psychologists). In the teaching of economics, politics, and statistics, films, other pictorial media, and sound recordings were very unlikely to be used at all.

3.4.5 Methods of finding published information (Question 64)

Respondents were asked to indicate on 5-point scales the usefulness of published bibliographies, abstracts, colleagues, searching library shelves, book reviews, references in books or journals, and other methods of finding published information relevant to their information needs in teaching.

Seventy per cent of respondents said that published bibliographies and abstracts were useful to some extent, 93 per cent mentioned colleagues as being of some use, 84 per cent mentioned searching library shelves, 95 per cent book reviews, and 97 per cent references from books or journals.

The pattern is familiar from the material in preceding sections which have dealt with methods of finding published information relevant to research. The method considered by far the most useful in teaching, as in research, was the tracing of references from books and journals. Forty-nine per cent of respondents said that this was the most useful method for teaching; published bibliographies and abstracts, discussions with colleagues, and searching library shelves were not so useful as sources of references, although they were used by most respondents to some extent (Table 375). Book reviews were, it may be remembered, rated as "very useful" in finding published information relevant to research as well.

These data bear out some of the impressions gained during the interviews, where it had already been established that the rather casual, and certainly unsystematic, use of book reviews and especially references contained in books and journals, was a common method of tracing published information relevant to research and teaching. The data here do however contrast with impressions gained in the interviews, in that 70 per cent of respondents to the questionnaire rated published bibliographies and abstracts as being of some use in finding out about published information; this was not the impression gained from the interviews, where formal bibliographical tools were played down. Data from the questionnaire and the interviews agree about the use of informal channels of communication as media for transmitting information about published material; they would certainly seem to be frequently used, although not necessarily rated the most useful. The data in Table 375 confirm the impressions gained from the interviews that the gathering of information for the purposes of teaching is a rather hit-and-miss affair, and rarely done in any systematic way. In section 3.2.9 it was seen that the role of secondary tools relative to the less systematic methods of finding sources of information was small in the case of research: the relative role of secondary tools was even smaller for teaching.

Older respondents rated book reviews more useful for locating published information for use in teaching than did younger respondents (Table 375), although about 95 per cent of all respondents used book reviews to some extent, irrespective of their age-group.

There were one or two environmental differences. Respondents from new universities rated abstracting journals and published bibliographies more useful in tracing references for use in teaching than did respondents from other institutions, and respondents from colleges of education rated these methods as less useful than did others, possibly because college of education libraries subscribe to fewer abstracting services than do universities. College of education lecturers also relied heavily upon book reviews - 55 per cent of them said that this was a particularly useful method of tracing material (Table 376).

Status was not an important factor here, but the tendency for older researchers to rely more heavily than others upon book reviews for tracing references relevant to teaching was also found when method of tracing references was related to the number of years in teaching or research. Those who entered teaching or research before 1950 were more likely to rate book reviews very useful for tracing references to published material than were others(Table 377). There was no evidence that respondents with more experience of teaching or research made any more use of informal channels of communication than did the less experienced; they were just as likely to rate contacts with colleagues useful in tracing references to published material. In fact, although the tendency was small, respondents with only two or three years' experience were likely to rate this channel of communication more useful than were teachers with ten or more years' experience.

Respondents in education, psychology, and geography judged abstracting journals and published bibliographies to be of more use in locating references for teaching than those who taught other subjects. Again, this pattern was familiar in the case of locating references for research, where mainstream psychologists and geographers were more active in using bibliographical tools. Teachers of psychology, anthropology and sociology found discussions and contact with colleagues more useful in locating references than did others. Teachers of psychology judged book reviews to be less useful than did others, but judged references in books and periodicals to be of more use. There were no other major differences between subjects taught. The only teachers to stand apart were the psychologists. They were more active than most in using abstracting

journals and published bibliographies, and in communicating with colleagues, less likely to judge book reviews important for locating teaching material, and more likely than others to find relevant references in books and periodicals.

3.4.6 Adequacy of the local book stock (Question 65)

When asked to estimate the extent to which their local library satisfied their information requirements for teaching, 9 per cent replied that all their requirements were satisfied, 53 per cent considered that most of their needs were met, and 26 per cent felt that only some of their needs were satisfied.

Local book stocks at Oxbridge were more likely to satisfy all teaching needs than were those in other universities; for example, 32 per cent of respondents from Oxbridge said that local book stocks satisfied all their needs. In the case of technological universities, local book stocks were less likely to satisfy all or most requirements (Table 379). This was expected; technological universities probably have the smallest university libraries in the country, while library provision at Oxford and Cambridge is vast.

The status of respondent did not affect the judged adequacy of local book stocks to any extent, nor did the length of time a respondent had been in teaching.

A comparison between the adequacy of local book stocks for teaching needs and adequacy of local book stocks for research is shown in Table 380. Where local book stocks were adequate for research purposes they tended to be adequate for teaching, but local book stocks that were adequate for teaching were not necessarily adequate for research. This can be seen when comparing the row and column ratios of Table 380. For example, when local book stocks satisfied all research requirements, only 58 per cent of all teaching requirements were satisfied. However, when all teaching requirements were satisfied in the local stock, only 20 per cent of the respondents had all their research requirements satisfied.

There were few discipline differences in the way in which local book stocks met information needs for teaching, and the data are not reported.

3.4.7 Accidental discovery of material (Question 66)

In the first part of the questionnaire questions 36a and 36b dealt with "accidental discovery" of references and information for research (see 3.2.21). Enquiry was limited in the second part of the questionnaire to the frequency with which items of interest or importance for teaching were found when searching for material in connection with research.

It was noted in 3.2.21 that the scanning of current periodicals, looking up a given reference and spotting something else at the same time, and conversations with colleagues, were the three main methods by which researchers accidentally come across information relevant to their research. Other methods, including wandering around library shelves, receipt of offprints or pamphlets, and looking in bookshops were responsible for some accidental discoveries; but methods such as publishers' handouts and newspaper articles, are not often of value.

Respondents were asked if, when searching for material in connection with their research, they found items of interest or importance for their teaching. Forty-six per cent of respondents did so often, and 41 per cent occasionally, while only 7 per cent said that this rarely or never happened. (Five per cent were not doing research, and so this question was not relevant in their case.) This data is reported in Table 381.

This kind of accidental discovery happened more often at Oxbridge than elsewhere, and was less likely to happen to respondents from technological universities and colleges of education (Table 382). The data relating to research institutions and government departments were not reported, because the number of respondents in these institutions who were engaged in teaching was negligible. As was to be expected, those who often came across references relevant to research by accident were more likely to find items of interest or importance for teaching during their searching for research material (Table 381).

Teachers in education, political science, geography, and arts subjects were more likely than other respondents to come across material relevant to teaching in this way (Table 383).

Those who concentrated on formal bibliographical tools - abstracting journals and published bibliographies - were more likely than those who made little use of these toolsto come across references relevant to teaching when searching for research material. It was also the case that those who frequently used book reviews and references in books and journals as a method of tracing relevant references for teaching were more likely to come across such references when looking for research material than were those who made little or no use of these methods (Table 384).

3.4.8 Keeping track of developments in broad subject areas for teaching (Question 67)

It was suggested to respondents that their teaching presumably covered a much wider subject area than their research.[1] Respondents were asked to indicate how they kept track of developments in this broader area. Seven hundred and twenty-eight respondents answered this question, and there was an average of 2.5 methods given in answer to the question. Reading and scanning periodicals was the method used most frequently, accounting for 26 per cent of the responses. In terms of frequency of mention it was followed by general reading (18 per cent), informal communication with colleagues and others (16 per cent), and book reviews (11 per cent). Only 2 per cent indicated that they did not attempt to keep track of developments in subject areas in which they taught. Browsing in libraries, conferences, and scanning abstracts, were all infrequently used, each accounting for about 6 per cent of mentions; newspapers, and weeklies (including the Times Educational Supplement) were rarely mentioned as methods for keeping track of broader areas of interest for teaching.

---

[1] One or two respondents pointed out that their research interests were, in fact, wider than their teaching interests, but there is no reason to suppose that this in any way invalidates their answers.

3.4.9 Conclusions

The majority of respondents combined research with teaching in the universities (as mentioned at the beginning of 3.4 teachers were not specifically included in the sample who received the questionnaire) and so the data give little indication of the requirements of teachers as such: what they do give is a comparative indication of the information requirements of teaching, as opposed to those in research, of respondents who, in the main, were both teachers and researchers.

The same general trends that appeared in 3.2 on requirements for research, also appeared in 3.4 on requirements for teaching. Discipline and subject differences, as well as individual differences, were in the main greater than the differences between teaching and research.

3.5 Publications, productivity, and information

3.5.1 Information input and output

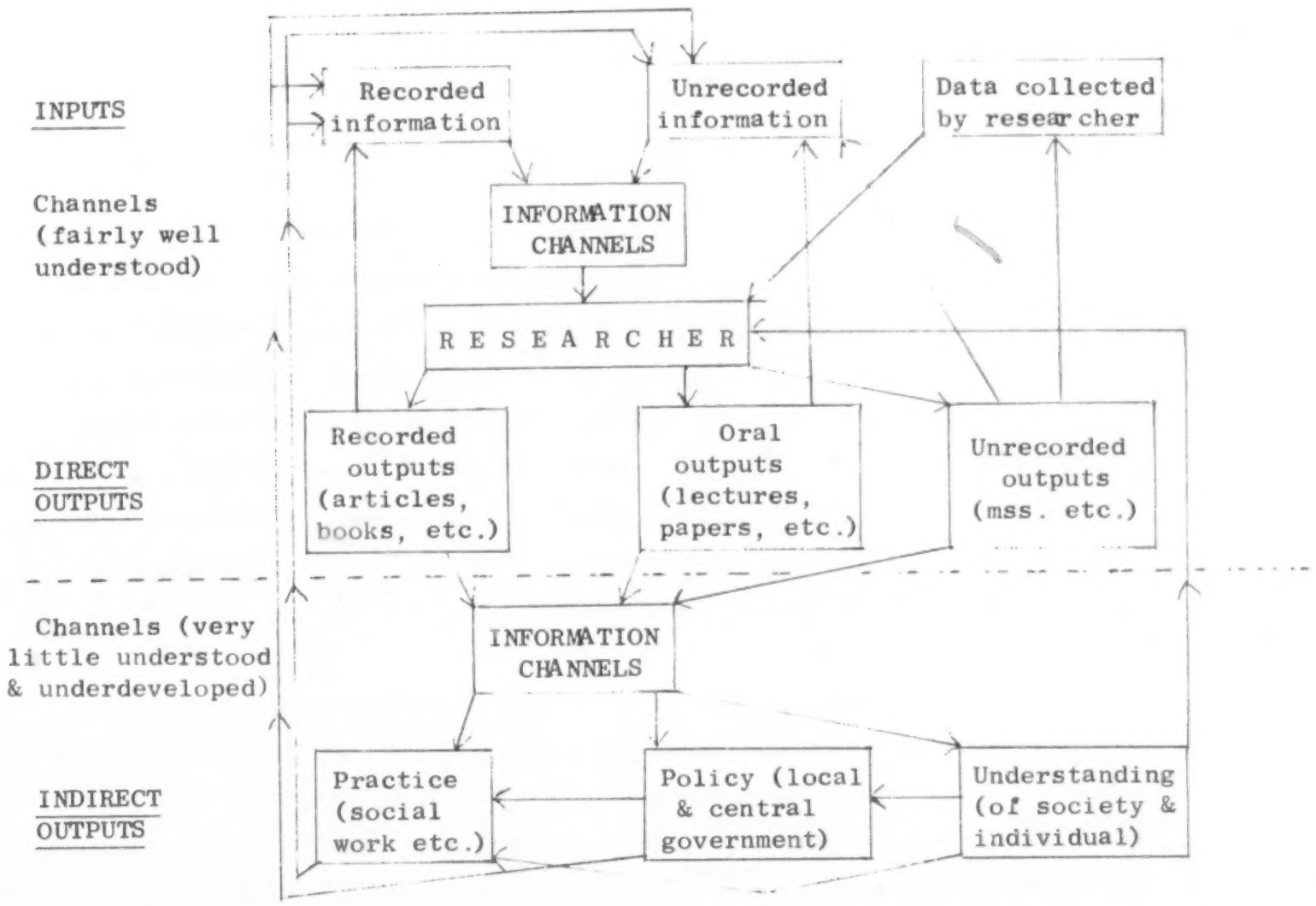
Although the present Investigation, along with most other user studies, concentrated attention upon the information required for research and teaching, in terms of other contexts (e.g. national policies for support and planning of research, information services) it is the usefulness and practical value of the results of research and teaching that are taken into account in the allocation of resources. It can be argued that the provision of information, itself an expensive commodity, by costly information services, cannot be justified in terms of the fulfilment of information requirements of researchers alone: only if the information is required to further research that leads to the solution of practical problems in the long term. The difficulty in this argument revolves around the concepts of usefulness and practical value. The argument is complicated by the tradition in science of supporting pure research in the belief that there is always potentially a payoff, and that breakthroughs when they do come (albeit relatively infrequently) have enormous scientific and technological consequences. It is doubtful if this state of affairs exists in the social sciences although the provision of information, both in science and social science, is now seen as part of the support that research requires, over and above the

limited and usually amateurish information retrieval efforts of researchers and teachers themselves in the pursuit of their research.

The allocation of resources for research (including information) is closely connected with the evaluation of the results of research and the measurement of performance in research. Measurements of performance in basic research include: (a) number of publications; (b) recognition by scientific community, for example, honorific awards, prizes, high status jobs; (c) citations; (d) ranking of research papers and scientists by peers. In applied research all of these measurements have been used, and in addition measurements of number of patents, new products, internal and limited circulation reports.

There have been few attempts to look at the relation between performance in research and information requirements and the provision of information services. Obviously this would touch upon only one aspect of performance - not all performance studies are concerned with antecedent variables. There are a number of focal points in this area. Attention can be concentrated upon performance in research as a measure in itself, on the relationship of performance to institution social and managerial structures, or, as Whitley and Frost (1971) suggest, the measurement of performance may reflect the desire of management for a basis for allocating resources and rewards. In fact, this latter area could well be extended to include the allocation and provision of information services.

In research communities the relationship between input of information and research output is complicated because typically researchers require information before they can do their research and information output is the product of their research. The various input/output possibilities are outlined in the following model of information outputs and inputs of researchers.



The processes and loops above the dotted line in the above diagram are fairly well understood, and the system is well developed. The processes below the line are not at all well understood - this alone stands in the way of development.

Information received by the user, whether actively or passively and by whatever channels, is defined as input; in the case of the researcher, outputs are usually verbal or written communications (e.g. a lecture, a report, an article, a paper, a book, or even a seminar); in the case of the practitioners, output is usually practical action of some kind. The output of the researcher may be input to other researchers, or to practitioners, or to policy makers - or just dead weight. A distinction can also be made between direct outputs (e.g. papers, lectures) and indirect outputs (e.g. understanding, action).

At one extreme, a situation can be envisaged where the only purpose of publication is individual advancement, and the only measure of output is publication. This is a self generating, self-perpetuating, and basically unsatisfactory system, even if there are useful by-

products of the need for production and publication. This raises the very fundamental question whether the information needs of researchers are in fact nearly as important as the information needs of practitioners.

Most user studies have been concerned with inputs. Studies of information needs and the bibliographical system required to provide them look for the best way in which documents of relevance can be brought to the attention of researchers and teachers. Few studies of the information system have touched upon aspects of user behaviour that determine information-seeking and gathering activities. The way in which the information contained in documents is used by the researcher or teacher, once it has been placed upon his desk, is not at all well understood. There are few studies of the research process, of creativity and scientific discovery, especially of the way in which these processes are related to information inputs.

It is common to assume that information is put to some useful purpose. It would be difficult to justify an information system for researchers or teachers on the basis of input alone. It is possible that situations exist where information input is wasteful, or even positively disruptive to research where it may work against research output. There may also be cases where the demand for information is insatiable.

The present Investigation dealt only at a very superficial level with these interesting questions. To a large extent the material gathered in the Investigation is of a descriptive nature, outlining the ways in which social scientists make use of primary and secondary literature, and in this sense the study follows the traditional user enquiry. It concentrates upon information inputs. Data regarding information input are necessary for information systems design, but other data are required. The nature, quality, and usefulness of outputs are also factors to take into account in design stages although number of publications as an indication of output or productivity is very crude. It could be maintained that, for a given piece of research, the information system which is associated with the largest output is the most desirable system, the one to be preferred and developed.

There is no doubt a relationship between information input and productivity. In fact, one or two studies in the social sciences have pointed in this direction. Parker, Lingwood and Paisley (1968) showed, in the interdisciplinary area of communications research, that a measure of interpersonal contact with other researchers was the strongest predictor of productivity. This index was compiled from assessments of receipt of pre-prints and unpublished papers, personal communication, personal contacts, visits, etc.: the greater the input, the greater the output. Researchers who had more personal contacts and who received more pre-prints etc. were more productive than researchers who had fewer personal contacts or who received fewer pre-prints. Shilling, Bernard, and Tyson (1964) found higher productivity in laboratories which permitted unrestricted use of long distance telephone calls and encouraged travel to other laboratories. Other studies (e.g. Cole and Cole, 1967) have looked at the social and environmental correlates of productivity rather than the way in which information input is associated.

The thesis is sometimes put forward that the study of the communication behaviour of scientists (and the subsequent design and provision of information services) is undertaken to learn about the relationship between information input and research productivity. Parker, Longwood, Paisley (1968) suggest that funds are invested in improved scientific communication in the hope that this will lead to a more efficient use of funds invested in the whole of science, and that if this is to be realised, the relationship between scientific communication and scientific research productivity must be demonstrated so as to show the kinds of communication that must be supported to achieve increased productivity. The United States National Research Council Committee on Information in the Behavioral Sciences (1968) Report on Communication systems and resources in the behavioral sciences suggested that the relationship between the information input and research output should be studied with the aim of designing information services that would have a positive effect on productivity.

3.5.2 Productivity (Question 11)

Respondents were asked to state the number of publications related to their research during the preceding three years. Their answers were related to the background variables and characteristics included in the analysis, and also to the major variables dealing with information and documentation requirements.

Sixty-nine per cent of respondents had published nothing during the three years previous to answering the questionnaire; 13 per cent had published one item; 7 per cent two items; and 6 per cent three items (Table 16). Over half of the respondents who had not published in the three-year period had worked on their project for two years or less. Because the number of respondents who had worked on their project for more than four years was small it was impossible to establish a reliable relationship between number of publications and length of time spent on their research project. The chi-squared test for this relationship was very significant, but of little value, as the distribution of respondents across the time variable was very skewed in favour of the short period spent on current research topic.

Sixty-eight per cent of researchers worked by themselves (Table 18); 14 per cent with one other person, 7 per cent with two other persons, 4 per cent within a research team of four, and 7 per cent in a research team of five or more. However, there was no strong relationship between number of publications and number of associates in a research team. For example, of the 117 respondents with a single publication, 59 per cent worked by themselves, 23 per cent with one other person, and 7 per cent in a research team of five. Of the 624 respondents with no publications, 73 per cent worked by themselves, 12 per cent with one other person, and 6 per cent in a research team of five.

It might be supposed that time devoted to research would be related to number of articles published. There was no evidence to suggest that this was so. The majority of respondents spent 28 or more hours on research per week. Researchers who had published ten items spent, on average, the

same time on research per week as researchers who had published none (Table 19).

The total number of articles published is a very raw and crude measure of productivity, although it is one of the few measures that can be operationally defined. In terms of the present analysis it is quite clear that length of time spent on research, number of workers in research team, and time devoted to research have very little effect on the number of publications produced. There was no indication of a significant connection between any of the information requirements investigated and number of publications. Many respondents complained about difficulties of physical access to material, but there was no relationship between this problem and number of publications: it cannot be assumed that time saved in obtaining bibliographic material would be spent on writing papers.

Thus, the present data give no clues as to how productivity could be increased by alterations to information inputs. It may be that a more detailed study of the research process in the social sciences would come up with clues about productivity (measured, it is to be hoped, in terms of quality, and usefulness in practice, as well as quantity).

Chapter 4

OVERVIEW

4.1 Objectives of Investigation

In the absence of large-scale user studies in the social sciences, the Investigation was undertaken to provide a national survey of information requirements in the social sciences and related fields. It was argued that reliable and valid data were required because, in the absence of knowledge about information requirements in the social sciences, solutions adopted in science could well be taken over, whereas there were good theoretical reasons to suggest that significant differences exist between the problems in the two fields.

The findings provide a comprehensive overview of the information requirements in the social sciences, although a large-scale survey of this type could not obtain great quantities of data in depth. Rather, the aim has been to provide an aerial view of information problems in the social sciences, from which areas requiring further attention can be identified.

It was the stated aim of the Investigation to provide material useful for the design of information systems. Data from user studies are not sufficient by themselves for systems design: other data are required about the details of the existing formal information systems, and especially the structure of the primary literature and the degree of bibliographical control that is currently provided; data from the testing and evaluation of actual and trial information services (which can also provide feedback data on stated user preferences and requirements); and data on the economic, psychological and practical constraints that an information system must meet. There is no point in conducting a survey of information needs for its own sake; the only point in doing so is to collect data which can be used for the improvement of information systems, or for the design of new ones. In

framing the questions, therefore, basic questions which seemed essential for information systems design were kept in mind. For example, did the basic pattern of information need divide according to discipline, or according to environment, or what? Were any patterns or trends detectable which could be associated with age, suggesting that the pattern of use and need was changing or likely to change in the near future? Did users have certain blockages or preferences which should be taken into account in designing information systems? What particular aspects of the formal system did they find difficult? What would happen if one created more abstracting journals - would they be used as well as, or in preference to, existing ones, or not at all? Should abstracting journals aim to be general and comprehensive, or specialized and smaller in size? Underlying all these questions, there was the basic question, what information does this person require for what he is doing, in what form, with what speed of delivery, etc.?

All main aspects of information need and use, formal and informal alike were studied. It is of course much easier to ask questions concerning the formal system than concerning the informal system, as it is "harder", more easily identifiable, and more memorable. Questions about the informal system tend on the other hand to be more general and vague. To explore informal communication more fully would require a much fuller use of interviews and of day-to-day observation.

The Investigation aimed to collect data not only on current information gathering practices and information uses, but on more fundamental issues relating to the nature of the work being carried out and the type of information required for it. Since one cannot ask very well what information a person needs without finding out what he is doing, it was necessary first to find out exactly what researchers were involved in. One of the earlier questions in the questionnaire asked how researchers were going about their research. This question proved too ambitious and difficult; it was hoped that researchers would be able to structure their answers in such a way that some basic patterns of research could be distinguished, but a fair number of respondents did not answer this question at all, and of those who did, the answers could certainly not be categorised into a limited number of basic patterns. There is a wealth of information in the answers to this question, but it did not

prove possible to code it in a form that could be analysed using the MVC program. However, the answers to this question still require and deserve study, since very little indeed is known about the research process in the social sciences.

Although most aspects of user needs have been covered by the questionnaire, the interviews, and the Experimental Information Service, further data on most of these aspects would be desirable. However, to judge from user studies in science, the effort required to obtain further information from surveys which could claim to be valid and reliable, would probably be out of proportion to the value of the information obtained. The law of diminishing returns with user studies using survey methods operates very rapidly; and it is doubtful if general surveys of the type so common in science, where the results are difficult to compare, contrast, and accumulate, would have much to add. At this stage, now that we have a general outline of the field, a more tightly knit type of investigation, in which hypotheses drawn from the survey data are tested in real-life situations, is required.

4.2 Method of enquiry

Three methods were used in the investigation. The main method was a questionnaire circulated to a national sample drawn from a population of all the social science researchers that could be found. The second method used was interviews, with three categories of person: a sample of those who did not respond to the questionnaire (in an attempt to see whether they were non-typical), some who answered the questionnaire but who were worth following up, and some who had deliberately been left out of the questionnaire sample, and who were approached only by interview. The third method was day-to-day observation of a very small number of social scientists. Technically this was not part of INFROSS, but a separate grant from OSTI; an Experimental Information Service (EIS) in the social sciences was established at Bath University, starting in January 1969, the dual aims being to test the validity of the concept of a personal information service in the social sciences in a university, and to gather data by observation on the day-to-day information habits of social scientists. This service covered social scientists in Bath (on a face-to-face basis) and in Bristol University

(by mail). EIS has contributed to INFROSS, providing a useful check on some of the findings from the questionnaires and interviews.

The social sciences were defined for the purposes of INFROSS as anthropology, economics, education, political science, psychology, and sociology. The main emphasis was on researchers, whether in universities or elsewhere.

With a very long questionnaire like this, the amount of data produced was absolutely enormous. Simply because the field was unexplored, a number of analyses were carried out that proved in the event to yield nothing of value, but this could not have been known beforehand. Some of the computer tables have not been included in this report at all. Further analysis of the data is still possible, and they are available to anyone who wants to use them as a mine for his own purposes.

The questionnaire data were presented in three ways: (a) straightforward frequency counts (e.g. percentage of respondents making use of theses); (b) two-way tables relating one information attribute to another or to a demographic variable (e.g. relationship between use of abstracts and subject of research, or relationship between use of abstracts and environment); and (c) three-way tables relating three attributes or variables (e.g. relationship between use of abstracts and subject of research for respondents in 20-29 age range). In the majority of cases the data in these tables were presented in terms of row or column ratios.

The limitations of cross-tabulation must be recognised: at the best they can be used to compute correlation coefficients, but measures of the statistical significance of the relationship do not of course imply causation.

4.3 Summary of major findings

For details of each section of the questionnaire data the reader is referred to the relevant subsections in Chapter 3. In this chapter the extent to which the data answer the questions raised in the Report on the Preliminary Stage is considered, together with comments on the more

striking findings of the study, and suggestions as to ways in which further studies could build upon the foundations laid by INFROSS.

It is not possible to offer a succinct statement of the findings of INFROSS, because the nature of the enquiry and the results do not lend themselves to this type of summary. The communication pattern in social science research is complex, and this leads to a multiplicity of requirements, sometimes almost imperceptibly merging into one another, and sometimes conflicting with one another. This finding is not confined to INFROSS. The only other major study of the information requirements of, and communication patterns in, a social science discipline - the American Psychological Society (1963, 1965, 1969) Project on Scientific Information Exchange in Psychology (PSIEP) - gave ample evidence of the complex nature of the information requirements of psychology. The type of data gathered and processed in INFROSS and PSIEP is not unlike the data obtained in the majority of user surveys in science and technology, where findings have not always been capable of being stated in a way that would make them directly usable in systems design.

The assumption was made at the beginning of the Investigation that there was an information problem in the social sciences. In the absence of social science user studies it was not possible to be absolutely certain that this was the case, but from the everyday experience of social scientists and librarians there was subjective evidence to suggest that an information problem existed. The appearance of new information services during the last decade was taken as further evidence that the existing information system was not capable of meeting existing and growing needs.

It can certainly be safely asserted now that there is an information problem in all of the social sciences. The problem has become more acute with the increase in published material, but it goes far beyond the problem of keeping track of new literature. Social scientists and information specialists are now more aware of communication difficulties, and of information services that can effect improvements in information transfer. There is a change of attitude, not always accompanied by a concomitant increase in knowledge about new services. The feeling that an information problem exists remains vague and largely unstated until the social scientist is exposed to larger quantities of information, and until his attention is drawn to the inefficient methods he often uses.

It is very clear from the data that as far as the researcher in the social sciences is concerned there is a long-term and complex interaction with the formal bibliographical system, especially with the primary literature. INFROSS data are mainly about this interaction; it is much easier to ask, and answer, questions about "hard" and identifiable channels of communication than about informal methods; it is in the formal system that improvements are most possible, and it is formal channels such as periodicals and monographs that spring most readily to the mind of respondents faced with questions about their information uses - they are more readily identifiable and memorable than informal contacts. There is no single outstanding finding to emerge. For example, it is not the case that nearly all psychologists use an abstracting journal and nearly all the sociologists do not - such startling and surprising findings would indeed be of interest and require much further research and attention. Instead there is a gradation of requirements and methods of use from one researcher to another and from one discipline to another.

The information problem in the social sciences extends much further than could be explored in depth in the Investigation. It includes questions about the use made of information after it has been retrieved and made available to the user, the nature of social science knowledge and research processes, the value of information for research and the application of social science knowledge. These questions are not unrelated to information needs: after all, ultimately it is the information that will make for better research, and that will lead to the solution of practical problems, that must be provided. Data on these aspects of social science research from the questionnaire were rather meagre, although some of these questions have been considered in an offshoot of the Investigation - a monograph by Brittain (1970).

4.3.1 General comments on information problems

Although the main section of the questionnaire concentrated upon the formal communication channels, there were one or two places in the questionnaire where respondents were called upon to make comments, and in other places some respondents recorded unsolicited comments. Some of these related to general issues regarding the function and use of information which were not specifically mentioned in the questionnaire, and also to the information problem as seen by the researcher. During interviews

there were greater opportunities to record comments.

Most researchers appeared to be familiar with formal bibliographical tools, though their use of them was unsystematic, not thorough, and limited (in that they used fewer tools than would have been useful). Many respondents were firmly oriented towards conventional print media and libraries.

> There is no substitute for a good library at one's place of work: any other arrangement (for example, central depot) entails too great a lag between the idea and its implementation.
>
> I do not welcome any of the movements away from the printed word.

Many suggestions and comments indicated that the information explosion was recognised as such; and that the solution is to be found in the reorganisation of methods of information transfer and bibliographic control (with additional emphasis placed upon the production stage of written material), rather than burdening the user further with more and more information, and thereby passing his threshold for assimilation. Respondents were not always very articulate when commenting upon information problems and solutions. A typical attitude expressed by researchers during interview is summed up by the comment from one researcher:

> There is a nagging feeling that one ought to be chasing information, and information about information.

There was comment about the function of information, and sometimes doubts were expressed about its value.

> Importance of information can be overrated. More information does not always result in increased knowledge and probably seldom produces increased wisdom.
>
> There are enough books already written to give one all the background information needed. The basic requirements remain energy, initiative, resourcefulness and application.
>
> In my field (professional developments) I find the real original work is seldom written up.

Problems of physical access to statistics and documents were often commented upon.

Accessibility of books is far more important than the provision of information.

Facilities for information seeking at the university compare unfavourably with research institutions.

More free access to government material.

There is a case for the publication of some government data.

Very hard to trace films because they are rarely mentioned in bibliographies.

There was also some dissatisfaction with the way in which academics are encouraged to publish because of the relationship it has to promotion, rather than publishing because there was something important to say.

There is too much publication of trivia based on inadequate evidence published by university researchers who need to publish to progress.

Find some criteria other than publication as a measure of academic standing. So much is published that communication is getting in the way of communication.

Apart from the two spaces provided in the questionnaire for spontaneous responses and comments, respondents had little opportunity to question the formal bibliographic system and the methods currently available for information transfer. However, there was enough comment contained in the questionnaire (and these were backed up with impressions gained from interviews) to show that not all researchers were satisfied with existing information services, although very few respondents had constructive suggestions. It would have been very surprising if some respondents and interviewees had not drawn attention to the increasing volume of published material, and to the problem of keeping up to date with their own field, which involves reading more and more, but at the same time drawing upon a smaller proportion of available material. These problems were mentioned often, but not to the degree that might be predicted by the exponents of the "information explosion".

4.3.2 Information demands, uses, and needs

Demands for, and uses of, information are partly a function of real and expected availability. Demands may not be made when there is a low expectation of availability, and obviously no demands are made when the user does not know of information that may be of potential

value to his work. Data were collected on most aspects of information need, whether articulated or not; questionnaire, interviews, and observation of day-to-day activities were used to supplement one another in exploring as many aspects of need as possible.

The results leave no doubt that a good many social scientists do not manage to satisfy all their information needs that could be satisfied, and that information of potential value is passing them by. This is due to: (a) lack of time or motivation to read material that could be easily made available or that is already available; (b) difficulty in retrieving information that is known or thought to exist; (c) ignorance of the existence of information that would be of value and relevance to research.

Lack of time/motivation. This problem is a complex mixture of user and system characteristics. The amount of social science research and literature is increasing, and except in very highly specialised areas the use is faced with either knowing less and less about his area of research or spending more time in information-gathering and assimilating activities. Better information retrieval services (in most of the social sciences computer-based retrieval services do not exist), incorporating acceptable selection and filtering techniques would go some way to reducing the burden of going through large amounts of information. Easier physical access to relevant material would also help. However, many social scientists complained about the amount of information that was immediately available (perhaps on the user's desk or as a note of a relevant reference in his files), rather than the difficulty of retrieving information. Improvements in information and documentation services could go only a little way in relieving these pressures. SDI services might help to relieve the pressure on the researcher caused by large numbers of irrelevant documents, as would improvements in precision of large-scale information retrieval services.

Difficulty in retrieving information. Some researchers described briefly during interview their ideal information system: it consisted of a local visual display unit (preferably on the user's desk) with immediate access using natural language for the first command sequence. Most social scientists were quite unaware of the technical difficulties involved in such systems - which in fact it may be quite possible to solve, at great cost - as well as the terminological and classificatory problems that are still very far from solution. Apart from problems of physical access to information, the greatest problem in retrieving information remains the entry of the user into the store of information.

In the social sciences especially, natural language enquiry from the user is often inappropriate for entry into information stores because of soft terminology, and the lack of standardization.

Ignorance of existence of information. This is largely a matter of exposure (assuming that the information would be recognised as relevant and of potential value to the user when it was seen). This can be achieved partly by more efficient methods of exposure (e.g. current awareness services to a larger percentage of the social science population) and by user education in the use of bibliographical tools. These methods provide for greater exposure than would be possible with the same amount of time and effort if the primary literature had to be scanned. Few libraries could match the potential for browsing, in terms of range of primary materials offered by abstracting journals. Also opportunities for multiple exposure might be required: a second or a third exposure to the same information, perhaps in different contexts, might affect judgements of relevance. The problem of unarticulated needs (due to lack of exposure and knowledge) was not limited to areas of peripheral interest, as might perhaps have been expected, or to disciplines judged as having marginal interest for research; in some cases researchers were ignorant of fairly large and important areas of knowledge related to their primary research interest. This was of course much more apparent in the case of practitioners, and found relatively rarely with researchers, but nevertheless, it appeared frequently enough to suggest modifications in the way in which users interact with the bibliographical system.

Most of the "harder" data from the questionnaire related to demands for current and known information. However, data were gathered on the potential use of new information services: for example, a social science citation index, which 95 per cent of respondents said they would find useful to some extent, and willingness to use, and to delegate reference searching to, an information officer.

The "softer" data obtained in the Investigation - impressions gained from the interviews, and spontaneous remarks made in the questionnaire - point to important aspects of social science research that are not generally considered in user studies, but which have a very strong bearing on the provision of information. For example, penalties for ignorance are generally less in the social sciences than in science; the way in which knowledge accumulates in the social sciences may be very

different from the way in which theory and data from experimentation accumulate in science, and may therefore make for different demands upon information systems.

4.3.3 Extent of social sciences: boundaries within social science, and classification of users

One of the objectives of the Investigation was to see whether information services should be developed along narrow-based and discipline-oriented lines, or broadly-based lines cutting across disciplines. It was necessary to obtain data about the pattern of need across all the disciplines and to make comparison from one discipline to another. With these objectives in mind it was obviously necessary to include in a single study as many of the social science disciplines as possible, so that comparable data from all disciplines would be available together.

From the point of view of information systems design and the supply of information, it is very important to be able to classify users according to their needs, for the simple reason that a comprehensive system for all types of user in all disciplines and environments is inconceivable. The most obvious classification of researchers (in social science as well as in science) is along the lines of the major disciplines, but it is possible that classification according to information requirements cuts across traditional discipline boundaries. It is one of the great strengths of INFROSS that it does provide a mass of comparable data within a very broad field, so that every finding can be related to other findings. It is of very little use, for example, to know that 75 per cent of sociologists do something, unless one has some idea of what other people do.

In planning for information systems within a broad area, the information transferred must be considered separately from the methods used to transfer it. It is obvious that there will be many subgroups of users within a broad area requiring different information. The boundaries, which may correspond roughly to patterns of need, may or may not follow discipline boundaries closely. Very little is known about the scatter of material across disciplines, or about the information and documents required in interdisciplinary research. These are major issues, affecting the possibility of a common pool of documents from which different

disciplines can draw, and are fundamental to the problems of dealing with overlapping areas.

Data were obtained from the questionnaire analysis about the channels through which information is transferred (e.g. journal, article, telephone, face-to-face contact, film), the relative frequency with which they were used, and their usefulness. Differences between disciplines were slight in this respect: that is, the use (and usefulness) of, for example, conferences or monographs did not vary much from one discipline to another. Details about individual items within each category of material (e.g. journals, books, reports) were not collected in the questionnaire. Some data were recorded in interviews about individual items; enough to show that the items regarded as central to researchers (e.g. "core" journals) were different for each major discipline. However, the materials required to satisfy information requirements in peripheral areas of interest, as well as those in interdisciplinary research, may be very different and may not show the same degree of separation as exists between the established social science disciplines. Bibliometric studies are now required to measure fairly precisely patterns of requirements for individual items and to see how far these patterns correspond with existing discipline and/or subject boundaries. Bibliometric data could be supplemented with further data from enquiries about user requirements for individual items.

When such data are available it may be that important differences will be found both between and within disciplines: differences relating to the structure of information systems, rather than their contents. For example, taking sociology and economics as examples, it may be that: (a) the structure of the information system serving sociology (e.g. ratio of abstracting journals to primary journals, percentage of communication taking place through informal channels) is not the one that best serves economics; and (b) there exist fairly homogeneous groups of users within an accepted discipline, to whom information that is generally thought to serve the users in the discipline has little or no relevance.

The Investigation has thrown some light on these questions. At least within the major social sciences covered in the Investigation, there is no evidence to suggest that each discipline in the social sciences

requires an entirely separate and specially constructed information system. Obviously the actual material that flows through the information system must vary from one discipline to another, but the way in which it flows could quite well be arranged on a common basis. Researchers from all the main social science disciplines make similar use, both in terms of frequency and purpose, of bibliographical tools; and with small variations from one group of users to another, they will tolerate similar delays in getting to know about material after it has been published, about current research in progress, etc.

The Investigation was unable to throw much light on the question of "inner circles" within the major social science disciplines, because most of the analyses of the data were made across the main social science disciplines: for example, psychologists were contrasted with sociologists, rather than specialists in psycholinguistics with specialists in sociolinguistics. An attempt was made to identify groups of researchers in interdisciplinary areas by cross-tabulating questionnaire data for researchers with a primary research interest in education and a secondary research interest in sociology (and vice versa), and the same for psychology and education. However, the narrowing of the subject range in this way did not highlight any strong differences in information requirements. It is in any case not a very good method for the identification of interdisciplinary researchers; there is, for example, no way of telling from the questionnaire data whether those researchers with a primary research interest in sociology and a secondary research interest in education can really be counted as sociologists of education.

The differences that were identified between the major social science disciplines were small compared with those between researchers and practitioners, and between researchers and applied social scientists. At the beginning of the Investigation several different categories of users were correctly identified: these were social scientists in government departments, college of education lecturers and school teachers, and social workers. The results of the study of these three groups are presented in Research Reports numbers 2, 3, and 4 respectively.

In brief, the differences between researchers and non-researchers

extend to the amount and quality of the information required, as well as the channels through which it is conveyed. The type and content of information required is quite different, and the way in which it is packaged and transferred must vary from one group to another.

There are other groups of users, who were not included in the sampling frame: for example, clinical psychologists as a special sub-group of psychologists, researchers in community development, and researchers in action research, mission-oriented research and applied research. Social scientists employed in industry were not included. It is probable that the information requirements of these groups differ from the requirements of researchers, perhaps to the same extent as requirements of non-researchers differ from researchers.

4.3.4 Demographic and environmental variables

The classification of users according to demographic, ecological, and environmental variables provides another way in which groups of users may be identified who have different information requirements. It is perhaps less likely that environmental differences play as important a part in determining information requirements as discipline or type of research, but nevertheless, if they do influence requirements to an appreciable extent, then they may be relevant to the design of information systems.

Few environmental differences appeared in the analysis. There was a minor example of environment exerting an effect upon communication patterns in the case of anthropology, which is a relatively small discipline, and very strongly represented at Oxford University. During interviews with researchers it was apparent that research in anthropology was largely localized at Oxford, where specialized collections of references and data were available, and informal contacts numerous. The same situation, where a discipline is localized largely to a particular environment, is unlikely to arise frequently. It is not the case with other disciplines in the social sciences, although within any discipline specialized research may develop and be located in a confined area. Information systems design must be flexible enough to accommodate localized requirements, although whether or not they are

met will always depend upon the economic viability of supplying small and specialized groups of users with services.

There is another environmental difference where the location of specialized research in a particular area is due to economic, geographical, or service reasons, rather than to historical reasons and the availability of printed material and libraries (as is the case with anthropologists at Oxford). Examples of research projects located in particular environments for these reasons include the Severnside and Tayside research projects.

Further studies of information requirements could look in detail at specialized pieces of research, contained perhaps in single institutions or at least fairly clearly defined geographical limits. Such studies would enquire into the ease with which information was obtained, the special role played by informal contacts and chance factors, and the effect of geographical factors on the flow and accessibility of information.

The fact that environmental differences are not a major factor in information needs is welcome, since it is hard to imagine how one would organize a system by environment when the primary materials are organized by, or fall naturally into, disciplines: the same materials would need to be processed in different ways to suit users in different environments.

4.3.5 Types of information use

The questionnaire contained three questions in this area. The first concerned the raw materials being used (archives, experiment or observation, interview or questionnaire, etc.); the second concerned the types of information used (historical, statistical, etc.); the third asked about the physical forms of information they used (periodicals, monographs, theses, etc.). The responses to these questions were related to discipline and environment, and indeed the three questions were related to one another in the analyses. In brief, what came out of these questions was that most raw materials, types of information, and physical forms were used by most categories; no particular

discipline or environment had a monopoly, or anything near it, of any one type of raw material, type of information, or physical form. Indeed, the answers to these three questions were analysed against the answers to all other questions in the questionnaire, and although certain patterns did emerge, the findings make it extremely doubtful whether any of these categorizations can be used as the basis for information systems design - that is from the user's point of view. From a production point of view it may of course make very good sense to produce separate bibliographies for reports and theses, as happens at present. The weakness of relationships between the answers to these three questions and other questions was something of a surprise; extreme concentrations were not to be expected, but neither was the very wide scatter that resulted from the analyses.

Of the various types of information listed in the questionnaire, historical and descriptive information was least used; methodological and conceptual information was used by nearly all respondents, with psychologists being the heaviest users; while the fifth category, statistical information, was most used by economists, especially those in government departments.

The answers to the questions on use of physical and other forms were rather interesting. The 3 per cent who never used monographs, and the 3 per cent who never used periodicals, were something of a mystery - perhaps due to error rather than anything else. The high figures for non-use of microfilms, and of non-book materials such as films, recorded sound, and videotapes, were interesting.

Respondents were also asked which two physical forms they found easiest or most convenient to use, which two least convenient, and why. As would be expected, books and periodicals were overwhelmingly the easiest or most convenient to use; while microfilms and non-book materials came out bottom. Interestingly, computer printout was not frequently listed among the inconvenient forms. The reasons given for inconvenience of microforms were the common ones. Increasing numbers of microforms, and increasing accessibility, have obviously not yet broken through the user barrier.

Respondents were asked which forms of information they used in their current research for each of the various types of information. Books and periodicals were used for all types. Of less common forms, government publications, newspapers, consultation with colleagues and conferences were associated with descriptive information; computer printout with statistical information; newspapers with historical information; computer printout and consultation with colleagues with methodological information; and consultation with colleagues, newspapers and government publications with conceptual information.

The formal information system is built around a small number of channels and formats for the transfer of information; the monograph and serial literatures form the greater bulk of the formal communication system, followed in importance by government publications. theses, research reports, etc. The more recently established channels of communication (for example videotape, audiotape, on-line computer use) are still used very infrequently by most researchers. There is no doubt from the data that the print media are vastly more important for the researcher than the non-print media. This must be partly due to the tradition established of using print media and the relatively late appearance of other channels and formats, partly to the habits already established in academic and research pursuits, and partly to the very small amount of research material at present available in these formats. The main conclusion to be drawn is that the new media are largely untried and unknown; their real place and potential have still to be established.

4.3.6 Informal channels of communication

The Investigation dealt as fully as is possible in a general questionnaire with informal communications; the interviews and the Experimental Information Service added useful supplementary information which could not easily be obtained by questionnaire. The results indicate that researchers enter into a large number of informal communications, with persons both in their own place of work and outside. Contact by correspondence and face-to-face meetings were the two most common methods of making external contacts, but exchange of manuscripts and offprints was fairly frequently used as well. Sixty-four per cent

of respondents had attended conferences in the previous twelve months. There was a tendency, particularly in anthropology, geography, sociology and statistics, for respondents who combined teaching with research to be more likely to attend conferences than those engaged in research only. An appreciable number of respondents had attended international conferences.

There were remarkably few relationships revealed by analysing use of informal channels against other answers to the questionnaire. Use of informal channels appeared to be unrelated to status, age, discipline, and even to extent of use of formal systems. There were some environmental differences; researchers in government institutions were most likely to use informal channels, those in colleges of education least likely. Also, the bigger the team, the more likely the researcher was to discuss his work with his colleagues - this is hardly surprising. There were however considerable variations in the answers to questions relating to informal channels, and it would seem most probable that the decisive factors are related to personality. While the personality characteristics of researchers would be fascinating to explore, unfortunately there is very little that can be done with the knowledge once it has been obtained: one can hardly devise different sorts of information systems for different personalities.

Conferences seemed to be of less information value than one might have expected. In general, the communications entered into at conferences proved to be of marginal rather than of central relevance, and, perhaps surprisingly, formal papers were considered as useful as informal discussion. This does not support the common view that what is really important at conferences is informal discussion. The conflict between the accepted view and the findings of INFROSS may be apparent rather than real; information gained at the bar may indeed be important and extremely interesting, although it may not always be relevant to immediate research.

4.3.7 Use of bibliographical tools

Abstracting and indexing journals. Respondents were asked to list the abstracting and indexing journals they used for their current research. Deliberately, a list of journals was not given, since this might have tempted respondents to mark tools they had heard of but never used. The open question carried the risk that respondents would forget some they had actually used, but they were unlikely to forget any they had used to any extent. In fact, many new abstracting and indexing journals, unknown to librarians or anyone else, were invented by respondents, some of them sounding quite useful, as well as a host of primary journals; it is evident that by no means all of our respondents knew what an abstracting and indexing journal was.

Sixty-five per cent of the sample mentioned one abstracting and indexing service (that is, one identifiable service - inventions were not included in the analyses). Sixteen per cent used two, 11 per cent 3, and 1 per cent as many as 7. Since material relevant to most of the social sciences tends to be widely scattered in the primary literature, and therefore in the secondary services, the fact that nearly two thirds only used one service is striking, though not surprising. The average number used was 1.7. An analysis of type of information against use of abstracting and indexing services revealed little relationship.

The individual tools most likely to be used were coded separately; in the event, some of these proved to receive very little use indeed. The only three services that came out really well were Psychological Abstracts, Geographical Abstracts, and Sociology of Education Abstracts. The first and second of these are probably the most comprehensive of abstracting services in the social sciences; the last is the best example of an abstracting service in the social sciences covering a limited area. This seems to suggest that where there is a good abstracting service, whether in a broad or narrow area, it will be used. Psychology and geography are, however, among the 'hard' social sciences, and psychologists and geographers appeared in several respects to be more akin to scientists in their information use than other disciplines in the sample. The sociological and economics abstracting journals are also good, but were not used to anything like the same extent.

Respondents were asked to rate abstracts, as opposed to simple author-and-title entries, when assessing the relevance of references. There was a strong preference for abstracts, those who used abstracts most having the strongest preferences. A small number considered that author-and-title entries were better than abstracts; this was not an error in their marking of the questionnaire, as they wrote it in themselves.

It was believed when designing the questionnaire that the terminological difficulties in the social sciences would cause problems in the use of abstracting and indexing journals for users when searching for subject entries. Thirty per cent of those who did find difficulty marked the category indicating that they found it difficult to put into convenient terms their subjects or concepts, and 33 per cent could not easily find the terms the indexer had used for these subjects or concepts. Sociologists found most difficulty. Those respondents who used informal methods of obtaining references most were most likely to find difficulty with abstracting and indexing journals, presumably because of their unfamiliarity. A different question asked about difficulties or inconveniences in using services they had listed; the most common comments concerned layout, and quality of indexes.

Abstracting journals were used by respondents mainly to keep track of research relevant to their own research, and also for keeping informed about current literature and more general developments. Their use for comprehensive retrospective searches was relatively rare.

A citation index in the social sciences. One of the most interesting findings in the whole questionnaire came from the answers to a question concerning citation indexes. A brief explanation was given of how a citation index worked, and respondents were asked to rate such a tool according to its potential usefulness to their research. Over half replied that such an index would be very useful, and only 5 per cent that it would be of no use at all. Answers to this question must be treated with caution, since it is hard to know whether all respondents understood fully what was meant by a citation index, and even harder to know whether they would actually use one if it were provided. However, the replies do suggest that a citation index is well worth trying. The theoretical advantages over

conventional tools are even greater than in the sciences; the terminology in the social sciences is "softer", the structure of knowledge is less stable (resulting in problems in arranging the contents of abstracting journals according to a classified arrangement), and the scatter of relevant material across primary journals is probably greater. An experiment with a citation index in the social sciences seems long overdue.

Use of library catalogues and bibliographies. Of those who replied to this question, 39 per cent did not list any library catalogues at all, and 41 per cent mentioned special bibliographies they had used. These two types of tool are the main means of access to monographs, as opposed to periodical literature, and their low use is rather surprising. A possible explanation is that in their own special field of research, respondents would expect to know the relevant monograph literature, and did not need to search specially for it. The question on the usefulness, limitations etc. of printed bibliographies and catalogues did not yield very useful results. However, it is worth noting that 47 per cent of users who commented on library catalogues thought the extent of detail in them was too little. It would be most interesting to know what extra detail they wanted. This question incidentally illustrates the difficulties of asking users about existing information tools; they are unable to envisage easily how they might be improved, and having no criteria against which to judge, their criticisms are often rather feeble, not to say naive.

Book indexes. A question about book indexes again was not very revealing. 40 per cent said they had experienced no difficulty in using indexes; 23 per cent said that indexes were often insufficiently comprehensive, and a further 25 per cent found this was occasionally so. Fifteen per cent found poor choice of terms or poor arrangement common problems, and 25 per cent found them occasional problems. By far the most popular suggestion for improvement was for bigger and more comprehensive indexes. Twenty-three respondents said that indexes should be prepared by professional indexers rather than authors, and 24 said that indexes should be prepared by authors rather than professional indexers.

4.3.8 Use of libraries

One question concerned the use of books - whether respondents generally needed to use them in conjunction with one another, or whether it was equally satisfactory to have them available consecutively. The point of this question was that if consecutive availability is adequate most of the time, inter-library lending and closed access systems are likely to be much more satisfactory than if books are frequently needed in conjunction with one another, when large open access collections would appear to be much more suitable. In fact, respondents were about equally divided. The "harder" disciplines - geography, psychology and statistics - were more likely to use books consecutively, while anthropologists were more likely to use them in conjunction.

More interesting is the number of libraries used by researchers. Three per cent said they used none; at the other extreme, 11 per cent used, or had used, 6 or more in connection with their current research. The older, more senior, and more experienced researchers tended to use fewer libraries than others; this may be an indication of mobility decreasing with age. Researchers in statistics used fewest libraries, psychologists next fewest. Among the heaviest users were historians, political scientists and geographers. Use of libraries was largely unrelated to the type of information required, and the physical forms used.

The adequacy of local bookstock was the subject of another question. Only 4 per cent found the local bookstock adequate for all their requirements, 33 per cent for most, 36 per cent for some, 24 per cent for few, and 3 per cent for none. Respondents from Oxbridge and government departments were most likely to find their local bookstock adequate, followed by respondents from Scottish universities and independent research institutions. There was a positive association between age of respondents and estimated adequacy; evidently, the older researchers get, the more easily they are satisfied. Those wanting methodological and conceptual information were most easily satisfied, those wanting historical and descriptive information least likely to find the local bookstock adequate.

Ninety per cent of the total sample made use of pre-1945 material; 6 per cent made use of pre-1800 material. Researchers in statistics, economics and education made the least use of pre-1945 material, the heaviest users of older material being in history and anthropology, and, to a lesser extent, geography. As for types of information required, there was a positive relationship between use of older books and historical material, a negative relationship with statistical material, and no relationship at all with methodological and conceptual material. The more volumes owned by a person, the more likely he was to use older books.

4.3.9 Methods of locating references for research

This question listed twelve methods (the twelfth being "other") of discovering references to relevant published information. Respondents were asked to rate them each according to usefulness. A quarter of respondents never used abstracts or indexes, library catalogues, searching library shelves, or book reviews. Rather fewer individuals (about one sixth) never consulted experts for this purpose, discussed with colleagues, or had discussions or correspondence with persons outside their own institution. Just under half never consulted librarians, and one third never used specialised bibliographies. By far the most common method was following up references in books and periodicals; 94 per cent of respondents found this method useful, and 59 per cent rated it as the most useful method.

The low use of librarians for this purpose is perhaps not a surprise. What is rather a shock is that the more senior individuals were more likely to find librarians of little or no use. Respondents in colleges of education did tend to use librarians much more than other respondents; this may be attributable to the intimacy of the college library, and the closer personal contact college librarians are usually able to have with their clientèle. It may also be partly attributable to the inexperience of college of education staff in finding out things for themselves; it was noticeable in several analyses that they were even less good at using the information system than their opposite numbers in universities and research institutions. Researchers in education were an exception: they were considerably more likely to seek the assistance of library

staff than other researchers. Statisticians were low on their use of most methods. Psychologists used abstracts and indexes much more than most, 63 per cent rating them as very useful; they also used librarians very little indeed. As one might expect, heavy users of print media (books etc.) used abstracts and indexes a lot, light users used bibliographical tools a good deal less. There was no difference in the use of bibliographical tools by users of non-book materials and of informal methods. One separate question was devoted to the ways people used of finding out about non-book materials, if they used them at all, since there are few guides as yet to these materials*: personal contact was the most common method mentioned. The methods that have been developed over the years for bibliographical control make possible a systematic approach to tracing references. The results of the Investigation show that in fact social scientists rarely make rational and systematic use of bibliographical tools. Instead, they prefer less systematic methods. For example, in locating references, researchers are much more likely to follow up references contained in journals and monographs they happen to be reading than to use bibliographical tools. Ninety-four per cent of respondents made some use of this method, and 60 per cent did so often; only 32 per cent made frequent use of abstracting and indexing tools for this purpose. The logical sequence of information/document searching, proceeding from tertiary and secondary bibliographical tools to the primary literature, is not followed.

The present formal bibliographic system is far from ideal: for example, the coverage of the primary literature by abstracting journals is poor in some areas, often the extent of coverage is not known. However, it is unlikely that these deficiencies in the formal system incluence users to any great extent, and therefore the present unsystematic, and in some cases infrequent, use of bibliographical tools cannot be attributed to these deficiencies along.

Although most respondents did not make great use of existing library staff for tracing references, 40 per cent of respondents thought that they could make extensive use of an information officer, and only 13 per cent said that they would not use one at all.

---

* At least, there were at the time of the questionnaire; NCET is rapidly remedying this situation now.

4.3.10 Keeping up with current publications

The most popular method of keeping up with what is currently being published in research was abstracting and indexing periodicals, mentioned by 40 per cent of respondents. The next most popular method was personal communication with individuals (19 per cent), followed by browsing in bookshops and consulting book reviews (each 13 per cent). Very little mention was made of review articles or of printed bibliographies such as BNB. Greatest use of abstracting and indexing periodicals for this purpose was made by researchers in geography, psychology, and education.

Eighty-four per cent considered it moderately or very important to know very soon after publication what was being published; only 15 per cent considered it not very important. The least demanding disciplines were anthropology, history, and statistics. There was no relation between the answers to this question and use of historical or descriptive material, but users of statistical, methodological, and conceptual material tended to demand speedy notification.

Answers to questions about what sort of delay is tolerable between publication and appearance in an indexing or abstracting journal are to be regarded with some caution, since they are almost bound to be conditioned partly by expectations; people do not usually ask for what they consider to be unreasonable or impossible. Nevertheless, it is still of interest to look at the answers to this question. Eleven per cent were willing to wait a year or more; at the other extreme, 8 per cent thought a delay of up to one month was tolerable, and 29 per cent a delay of between 1 and 3 months. Psychologists were most demanding, followed by researchers in education; next came geographers, economists, sociologists, political scientists, and, last, anthropologists and historians. Users of methodological and historical information were least anxious to have speedy appearance in abstracting journals. Applied researchers were most demanding, followed by experimental researchers. Those who used a number of abstracting journals tended to tolerate less delay than those who used only one.

4.3.11 Keeping track of current research in progress

Some respondents did not bother to keep track of current research at all. The most common method of keeping track was some form of personal or informal contact; 37 per cent of mentions were of informal methods of one kind or another, compared with 18 per cent of formal methods, such as research registers. There was little difference between subjects in answers to this question. Problems mentioned by respondents were, in order of frequency of mention, lack of published information about ongoing research, incomplete or out-of-date research registers, difficulty of tracing research in other countries, time involved in tracing research, non-cooperation from other workers, mass of material too great to work through, no central indexing or abstracting services for research in progress, difficulty of physical access to material, and field of research too small to warrant time spent in tracking it down. Researchers in government departments and technological universities mentioned many more problems than researchers in other environments.

Perhaps not surprisingly, respondents tended to use similar means for keeping track of currently published material and of research in progress. Those who kept track of research in progress were particularly active in the use of informal methods.

4.3.12 Delegation of searching

Respondents were asked about the extent to which they delegated searching at present, and the extent to which they would be willing to delegate to a hypothetical information officer. At present, delegation seems to be rare; only 7 per cent delegated extensively, and 72 per cent did not delegate at all, though the older and more senior respondents were more likely to delegate (only 43 per cent of professors did not delegate at all). Researchers in non-university environments delegated far more than those in universities, presumably because library and information services are usually more positive and developed in these places. When asked about their willingness to delegate, however, the answers of respondents were totally different. Only 12 per cent stated that they would not be willing to delegate at all, the remainder

of respondents being about equally divided between those who were willing to delegate extensively and those who were willing to delegate partially. Reasons given for unwillingness to delegate included the view that no one else other than the researcher was competent to do the researching, that it was difficult to formulate precise instructions, that the serendipity value of searching was lost, and that a particular subject area was so small as to make delegation unnecessary. Those involved in applied or experimental research were more willing to delegate; users of theoretical or historical material were least willing. One might suppose that those who wanted factual material (e.g. statistics) would find it much easier to delegate than those who wanted theoretical or conceptual material, and this was in general the case, but researchers in education and sociology were most willing of all to delegate, and neither of these disciplines can be said to be entirely concerned with hard data. Those researchers who were most concerned with speed of notification were most ready to delegate.

Of those who stated that they would be willing to delegate partially, 73 per cent did not actually delegate at all at the time of the questionnaire; of those who were willing to delegate extensively, 61 per cent did not do so. If information officers were available on the required scale, and respondents did what they actually said they were willing to do, there would obviously be major and fundamental changes in their information habits. What is not known is whether this willingness would be a wholehearted one, or forced on them through shortage of time and other extraneous factors. However, even if this is so, it does not invalidate the willingness of researchers to delegate, nor the value of information officers if they were available.

This may not be the most significant finding of INFROSS, but it is certainly one of the most interesting in its implications. If extensive delegation to information officers were the general practice, the whole design of information systems would be fundamentally affected. At present, information systems are designed, if not for easy use by researchers, at least with their usage in mind. This prevents their development beyond a certain level of complexity and sophistication, though even so some bibliographical tools are by no means easy to use. If, however, one could assume an intermediary always between the

information and the user, information systems could be developed to almost any level of complexity; the enormous constraint of ready usability would cease to exist, and this should make it possible for far more efficient and effective retrieval systems to be developed.

One final word on information officers may be desirable. The use of librarians was minimal. This contrasts very sharply with willingness to delegate to someone called an information officer. To one respondent, at least, there would be a serious snag in delegation: he said "Much of my pleasure in research is gained from the search for the material. Last summer I covered about 500 miles ...".

4.3.13 Late detection of information

The phenomenon of late detection is a difficult one to interpret. Admission of late detection can indicate either conscientiousness or laziness. The conscientious information hunter is likely to come across so much information that some of it is almost bound to be late; at the other extreme, the passive grazer, while likely to receive much less information altogether, is bound at times to come too late across information he could have found in time if he had been assiduous. In the first case, the system may be held largely to blame; in the second, the researcher has no one to blame but himself. Seven per cent of our respondents stated that they frequently came across information too late to be of use to them, 68 per cent occasionally, and 26 per cent never. Respondents at colleges of education were the least likely to experience it, presumably because of inadequate exposure to information sources. Heavy users of the less commonly used physical forms of information (research reports, theses, government publications, etc.) were more likely to find information too late, as were those who used the formal information system heavily, and those who most wanted speedy notification of new publications. The penalties for late detection in the social sciences are a good deal less than in science and technology, where, for example, ignorance of a relevant article on a researcher's special subject can make all the difference to the value of a piece of research, quite apart from the question of priority of discovery.

4.3.14 The use of foreign language material

Social scientists, like researchers in all other fields of scholarship, do not draw upon the world's literature for their research. From the analyses of the data undertaken so far it is not possible to say that social scientists make less use of foreign language material than scientists. A further study is in preparation in which the data from the Investigation will be compared with data from other studies of the use made of foreign language material.

The problem seems to lie not so much in inability to speak a foreign language, as in the methods that researchers use to deal with material that they come across in foreign languages, and of course, their reluctance to scan foreign language publications to pick up material that may be of relevance to them. Forty-eight per cent of respondents could read French, and 17 per cent German; only 11 per cent of respondents could read no language other than English. Compared with scientists, it is suspected that coverage of Russian literature by social scientists is fairly small, because only 2 per cent of them could read Russian. However, it could be argued that the amount of material in Russian that is relevant to social science is fairly small anyway; psychology may be an exception, but psychologists were only slightly more likely to read Russian than other social scientists.

Researchers in education, psychology, economics, and statistics were less likely to read foreign languages than researchers in geography, political science, and anthropology. This difference may reflect to some extent the relative amounts of foreign language material in these disciplines, and partly the different degree course requirements for proficiency in foreign languages across the social science disciplines. However, by any standard, the situation looks to be far from satisfactory, with the possible exception of the proficiency which social scientists show in French. Further data were obtained about the methods used to deal with literature in languages not read by researchers. The usual practice was either to ignore the article (especially if it was not available locally), or to obtain an abstract of the article in English. Researchers were unlikely to go to the trouble of commissioning a translation. When material was judged to be important for research,

there was a much greater tendency to obtain a translation, and only in a few cases was the material ignored: but the number of articles that were judged to be important for research was very small absolutely, and relatively they may represent an extremely small proportion of articles that would be judged relevant if foreign language material came to the notice of researchers to the same extent as English language material.

Proficiency in foreign languages had, according to respondents, little effect upon their choice of research topic: that is, the topic of research was not usually dictated by the degree to which material in foreign languages was felt to be relevant and the researcher's foreign language ability, no doubt because it was assumed that in most areas of social science the amount of relevant foreign language material is small (this assumption may be the result of rationalization). Once research was under way, its conduct was not greatly affected by foreign language problems: here again, researchers may have prejudged the issue by making assumptions about the lack of material in other languages.

4.3.15 Special information problems

Respondents were asked whether any information problems of special difficulty or importance had arisen during the current research of the respondent. Much the most common special problem mentioned was physical access to, and availability of, information, published and unpublished. A large number of other problems were mentioned, but none of them was mentioned by more than a few individuals. College of education researchers were least likely to mention problems; again, this seemed to be an indication of their limited horizons. Theoretical researchers did not have much to say in answer to this question, probably because much theoretical work depends on hard independent thinking, rather than on utilizing the work of others. Of the various disciplines, geography seemed to have the most problems, psychology least.

Respondents were also asked whether they were able to solve the problems they listed, and to what extent. Only 3 per cent said that they had solved them to their full satisfaction as quickly as desired; a further 8 per cent had fully solved them, but less quickly than desired; 57 per cent had only partially solved their problems, and 22

per cent had found no solution at all. This adds up to a large number of unsolved and partially solved problems, but the information system may not be to blame for this - some of the problems may simply be insoluble, in the sense that the relevant information has simply never been created.

4.3.16 Teaching needs

The final part of the questionnaire concerned information needs in teaching, as opposed to research. The Investigation did not set out to capture teachers as teachers, although the sample did in fact include some who were not doing any research at all, only teaching. However, this last part of the questionnaire enabled a comparison to be made between information needs in teaching and in research within the same individuals. In fact, they proved not to be very different, though there were some different emphases. What did appear was an interelationship between teaching and research, in the sense that in hunting for information relevant to their research, individuals often came across information relevant to their teaching, and vice versa. Library bookstocks tended to be rather more adequate for teaching needs than for research needs, but this is not surprising.

4.4 Questions/problems for further study

The following general questions and problems have arisen during the Investigation. They are not of course limited to this particular enquiry, nor indeed to social science user studies; they touch upon fundamental issues in information science. More specific tests that can be carried out on information services are proposed for the new project at Bath University - research towards the Design of Information Systems in the Social Sciences (DISISS).

(a) The objective of user studies (not always stated as such specifically) is the production of data that can be used in information systems design for the introduction of new information services, and/or the modification and improvement of existing ones. Most user studies omit to indicate ways in which the results can be incorporated into information systems design. Further research is required to make the results of user studies applicable to

information systems design; otherwise only the most general guidelines are available. In detail, it is necessary: (i) to know the way in which the results of user studies are related to other system variables; (ii) to obtain the data required to implement the results of user studies in information systems design; and (iii) to acquire feedback from prototype information systems and experimental services, providing further data on user requirements which can be incorporated in refined systems.

(b) Part of the data required for systems design in (ii) above is a detailed specification of the material that is used and required. A user study typically provides data about the relative use of channels (although here some indication of absolute rather than relative frequency of use is required for design purposes), but the individual items, their frequency of use and importance, have to be known if the data are to be used in systems design. Data on the use of specific items can be obtained from a combination of methods including citation counts (which probably produce the most objective and reliable data although not necessarily the most valid), followed by case studies of users, from information officers, inter-library loan statistics, and various types of library survey.

(c) Data on the interaction of users with information systems is required in design. To some extent INFROSS established the users' interaction with the existing information system (although even here more detailed observations could be made); but in the presence of unfamiliar systems (e.g. on-line computer displays) a number of the interactive factors may change quite drastically.

(d) A distinction between information and documents has rarely been made in studies of information needs. The distinction is of crucial importance as information systems design progresses from a mere recording and retrieving of documents (which may include technical improvements in physical access, identification, etc., to more sophisticated information services, including packaging of information and data, and information analysis centres. Further studies should aim at bridging the gap between the concepts of information and documents. For example, little is known about the way in which information is put into and extracted from documents (a hardware problem as well as a psychological one, in which the cognitive aspects of information processing would have to be considered).

(e) Studies of use and need should take place in conjunction with studies of the usefulness and value of information. Data about the quantity and quality of social science information, the relevance of social science information to research and practice, the nature of social science knowledge and the way in which it accumulates to form building blocks for the advancement of the social sciences are required in information system design. These are problems that have been neglected by information scientists.

(f) The generation of information, as opposed to the demand for it and its use, is commonly neglected. Researchers are typically producers of information: at the other end of the user spectrum,

the practitioner, and perhaps to a lesser extent the applied scientist, are users but rarely producers. Longitudinal studies of the passage of information through information systems is required. As information passes through the system it continually changes shape. For example, information may begin as an early communication of a new experiment or piece of theoretical research to immediate colleagues; it may then pass through a prepublication manuscript to published documents, and then into abstracts. Further changes occur when the information is condensed in repackaging for inclusion in abstracting journals, reviews, or state-of-the-art reports. At the final stage of transformation information (or a document) is cited in the work of other researchers: less frequently, citations may amount to quotations. At each stage in this process different needs and requirements are satisfied, although very little is known about the multipurpose function of information in which, during its life cycle, a variety of needs and requirements can be satisfied.

(g) A study of the production side of information would throw light on the relationship between needs and requirements at producing and receiving ends of the information transfer process. It is suspected that the two rarely coincide: that is, producers of information do not usually write or publish because a need for the information exists. When a book is published the writer may have something to say, but not necessarily what the user wants to hear, and the publisher is guided largely by profit considerations. It is only at the level of information retrieval and literature searching that needs are seen or specified.

(h) An important question hardly touched upon in the Investigation concerns the degree of effort and time that a researcher is prepared to put into getting information. For example, no assessment was attempted of the man-hours spent in tracing information. Some indication is required of the time spent in various aspects of information seeking and gathering (e.g. time taken travelling to and from library, using catalogues, seeking assistance of librarians, finding material on shelves, browsing, reading, and recording bibliographic details, ratios of time spent on secondary/primary material, checking out material, etc.), compared with the time spent in actual reading of retrieved material, writing, gathering data from experiments/surveys, etc. Little has been done to establish optimum reference-seeking activities: for example, how long should researchers pursue a search through the formal system before seeking the help of library staff or information officers, or should they go to library staff first?

(i) A related question to the one above concerns the ergonomics of bibliographical tools. Well-designed tools and systems could reduce seeking effort considerably. If the researcher could spend less time on checking catalogues and bibliographies, he might be able to spend the time saved more profitably on other aspects of research. Most social science researchers found the tasks involved in locating and retrieving documents and information fairly time-consuming, and a task they did not relish.

(j) Very little is known about the stages of research and the different information requirements that may characterize each stage. For example, it is doubtful if the classical model of research, where the researcher undertakes a thorough review of the literature before planning his research and starting to collect data, is followed by many social scientists (indeed, it is doubtful if this takes place in the sciences). In fact, researchers were asked in the questionnaire to indicate the stages of their research chronologically. The answers were very varied, and although an attempt was made to code answers for input into the MVC program along with the rest of the data, it proved to be an impossible task because of the limitations of the program and the diversity of answers, which could not, as was hoped, be classified into a moderate number of patterns. However, further attempts are being made to process the answer to this question, and it is hoped that the results will be reported later and incorporated into subsequent research.

4.5 Changes in emphasis

At the time the Investigation began in 1967 very little was known about information problems in the social sciences, with the exception of the studies by the American Psychological Association. However, in science and technology, there were between 400 and 600 studies (depending upon the method used to calculate the number and the way in which user studies are defined) and it was very apparent that social science information requirements had been almost totally neglected. The role of user studies in information science and information systems design has been discussed in the last few years, and serious doubts have been cast upon the usefulness of unlimited enquiries and unguided developments (e.g. Allen, 1969; Herner and Herner, 1967; Menzel, 1966; and Paisley, 1968). These authors have pointed out that the results of user studies are often incompatible and do not accumulate to form a body of knowledge about information requirements. Criticisms have been levelled at the methodology of user studies, and indeed about the feasibility of establishing information needs by asking users (Menzel, 1967).

Changes in emphasis can be attributed in part to the twenty-one reports issued by the American Psychological Association between 1963 and 1969, and the writings of the researchers Garvey and Griffith (1963, 1964a, 1964b, 1966, 1967a, 1967b, 1968; and Griffith and Garvey, 1964) engaged upon the Project on Scientific Information Exchange in Psychology (PSIEP). Following the APA studies, the Experimental Publication System

(EPS) and the National Information System for Psychology (NISP) have developed as experimental services during the last two years (Kinkade, 1970a; Van Cott, 1970). Also during this period the United States National Academy of Science/Social Science Research Council (1969) published Behavioral and social sciences: outlooks and needs, and the National Research Council Committee on Information in the Behavioral Sciences (1967) issued Communication systems and resources in the behavioral sciences. These reports dealt, at a fairly general level, with the state of research in some of the social sciences, and looked at information requirements and needs largely from the point of view of the nature of social science research and the structure of social science disciplines. At a much less ambitious level information services have been developed for social scientists and practitioners closely allied with the social sciences. These include an information officer for social scientists for an experimental period (Bath University of Technology, 1970, 1971); the selected dissemination of information to social work organisations (Bloom, 1969); and new forms of publication, including the re-introduction of a Current Contents series for social scientists.

The INFROSS team has had contact with a number of researchers working in the field of social science information, as well as many contacts with users. This has undoubtedly had an effect upon the thinking of the INFROSS research team. INFROSS has been the major study of its kind, and one of its functions has been the informal coordination of activities in social science information research.

Briefly, changes of emphasis that are now apparent are given below. The future of user studies in the social sciences may well depend upon these changes of attitude, just as much as on the hard data from the Investigation.

(a) Rethinking of the objectives of user studies, and the way in which the results of the user survey can be applied in systems design

(b) Emphasis upon the usefulness of the results of user studies, rather than the accumulation of data from user surveys as an end in itself

(c) The extreme difficulty of establishing information needs as opposed to demands or uses

(d) The problem of the non-accumulation of information and data in the social sciences, and of the nature of knowledge in the social sciences

(e) The necessity for further studies of applied fields in particular, the identification of new areas of research, particularly action research, mission-oriented research and applied research - areas in the social sciences which are developing fast

4.6 Comparison of results of INFROSS with other studies of social science information

A review of the literature on social science user studies was undertaken, expanded and published as a monograph (Brittain, 1970), where it was concluded that very little work had appeared since the last review of social science user studies was made by Paisley (1965). The few studies dealing with various aspects of social science information that have appeared since Paisley's review do no more than explore the field and highlight problems. The only information research to appear in the social sciences that is comparable to INFROSS in terms of scale is the APA study; and although this dealt only with psychologists, the relevant parts of INFROSS must obviously be compared and contrasted with the APA study.

To begin with, the differences in finance and aims of the two projects must be stated, because this has affected the findings and the comparability of the results. The range and scope of PSIEP, as well as the resources available from the APA, were greatly in excess of those available in INFROSS. Over a period of five years the PSIEP was able to cover many of the formal and informal aspects of information flow, production and dissemination functions of journal and other print media, the informal exchange activities of psychologists at conferences, and many aspects of the information system that are identified in the present chapter as topics that require further attention. Secondly, the PSIEP had as a test bed Psychological Abstracts and potentially all journals published by the APA, in which some changes could be effected. Early on in PSIEP some recommendations for change were fairly quickly tried out, then introduced: namely, a reduction of the delay in getting primary material into Psychological Abstracts, and the introduction of pre-convention circulars for discussion (a practice, incid-

entally, which has been followed by the British Psychological Association since 1970, although without, at least so far as is known at present, feedback about its desirability or usefulness). Thirdly, and this is not so well known, the most recent developments in the APA National Information System for Psychology (NSIP) do not depend directly upon the results of PSIEP. In fact, additional planning in the form of Experimental Publication System (EPS) was required before new information services could be designed and implemented (Clark, 1971; Kinkade, 1970a; Van Cott, 1970).

When the results of PSIEP are compared with the INFROSS findings a number of differences appear. These can be attributed to a number of factors: (a) real differences between psychologists and social scientists in general; (b) differences between American and British psychologists; and (c) differences in methodological approaches between the two studies, which may have included differences in emphasis, questions, etc.

In PSIEP Report number 9, the number of psychologists reading journal articles was very low relative to the number of subscribers to journals published by the APA. Data on this was not obtained in INFROSS, but would be very useful in gauging the exact degree to which the present system is used.

As part of the planning for NISP, a study by questionnaire about the attitude of APA members towards Psychological Abstracts, APA journals, and possible innovations in communication and information services, was conducted (Kinkade, 1970b). It was suggested that the coverage of Psychological Abstracts should be extended, that it should be divided into sections, that the time lag between publication of articles and appearance of an abstract should be between one and two months, and that a time lag of four to eight months would be unacceptable. This is in contrast to the data from INFROSS where 74 per cent of psychologists would accept a time lag greater than three months, and only 3 per cent specified less than one month.

On the question of scatter, APA members expressed dissatisfaction with the way in which material of interest to them was scattered over a wide range of journals. Researchers in the INFROSS sample accepted the fact

that a good deal of the information they required was scattered, and that searching and retrieval were part of the process of research (the position was very different for practitioners). It is inconceivable that all information of interest should be contained in a small number of journals. Perhaps it could be contained in a small number of information systems, but that is quite a different matter. This difference between American and British psychologists may be due in part to the large number of practitioners, including clinical psychologists, who are included in the APA membership, and whose information requirements have been carefully considered in the planning stages of NISP.

On many other aspects of information need, INFROSS and APA questionnaire data are in agreement. Visual and auditory methods of information transfer were not particularly attractive to respondents for the transfer of primary information and the newer communication media were used only infrequently, although as teaching aids many respondents wanted to make use of audiovisual teaching aids - quite a different field from information transfer between, and within, the research community as such. About two-thirds of respondents in the APA study wanted to use films to illustrate psychological techniques: this is perhaps an information requirement specific to psychologists, which did not emerge in INFROSS.

There was general agreement between INFROSS and PSIEP about the value of some information services: for example, monthly lists of new books, and selected bibliographies in major topical areas of psychology. A large majority felt a need for state-of-the-art summaries and other forms of packaging and information distillation.

The INFROSS questionnaire included questions about raw materials of research, methods of keeping track of references, and ways of keeping informed. Each of these activities was accounted for, to some extent, by methods, tools, and materials that were not specified in the questionnaire. A category was provided for "other" and between 5 and 10 per cent of responses fell into this category. It was not possible in analysis to identify individual items in the "other" category. Nevertheless, in some instances the number of responses that fell into this category is enough to suggest a need for further study. It is possible that the methods of locating references for research, keeping in touch with

current research, etc., mentioned in this category are quite important, and would at least supplement existing methods.

It has been suggested (Brown, Pierce, and Taube, 1967) that many researchers express discontent with the present journal system: for example, that too few of the important papers produced are published in journals. Discontent with existing serials publication was expressed by American psychologists in PSIEP. In fact, one of the chief justifications for EPS was the discontent with the existing transfer of information through the formal journal system. Brown, Pierce and Taube (1967) stated that delay in publication was the single most frequent complaint about current scientific journals. A reduction in the delay of producing Psychological Abstracts followed, and although long delays have remained in the publication of articles in journals published by APA, some of these journals now include a list of manuscripts accepted for publication. The changes in the formal communications system instigated by APA were based upon the assumptions that: (a) a greater degree of focusing in the distribution of information was required, so that individual researchers were provided with a "hand tailored" service; (b) a diversity of contents must be available in the information system, but not necessarily incorporated into the material that flows to individual researchers; (c) there must be a minimum editorial effect upon the material and research that is published; and (d) a reduction in the delay of publication and dissemination is very important.

With these general principles as guide lines the APA Experimental Publication System proposed that journals stopped binding papers into issues and distributed instead to each researcher and practitioner a stream of single papers, abstracts and titles. The preprint exchange system was considered, but met with a good deal of opposition from established journals in psychology, and in planning for NISP the idea has been considerably played down. However, the EPS represents a compromise on this matter; in order to avoid delays and to ensure that much more material reaches researchers than does at present through the formal system, the EPS transmitted documents to users on a personalized basis with minimum delay after preparation of the documents, and with minimum interference from journal editors.

Many information systems have been designed and existing ones modified in the belief that prompt dissemination of information is of paramount importance for scientists, and that other factors may have to take second place. There are at least three aspects to the delay in disseminating the results of research, and it may be that they must be differentially catered for in an information system. There may be a delay between: (a) completion of a piece of research and its publication, usually in a journal, a report, or, less frequently, in a monograph; (b) publication and researchers getting to know about it; and (c) publication of articles/monographs and their appearance in secondary sources. East part of the information transfer process contributes to the delay to some extent. A general model of information transfer is as follows: (a) research; (b) some local dissemination to immediate colleagues and contacts; (c) presentation of preliminary results and conclusions at conferences, local meetings; (d) perhaps preprint dissemination; (e) publication; (f) entry into secondary and tertiary sources, where bibliographical control can be exercised. This is the model that was suggested in the PSIEP studies, although it is not necessarily always the case, and one or more of the steps may be missed out in information transfer. If all these parts of the dissemination process follow quickly upon each other, then most researchers would perhaps wait until material could be retrieved through the secondary sources (which would be the most efficient communication procedure, in the sense that the greatest amount of information could be transmitted with the least degree of effort), but the time lag between successive elements in the model can be very long. A suggestion that came early on from PSIEP was to reduce the delay by formalising (supposedly inefficient) informal communications. In science, this aspect of communications is often referred to as "the invisible college", although the existence of such a network in the social sciences has not been firmly established. To reduce the various delays, as well as to get other information about research which is not very suitably conveyed by the formal system, researchers go in for informal contacts, prepublication dissemination, conferences, contacts with immediate and more distant colleagues, etc. However, when such activities are formalised much of their attraction and flexibility is lost.

From a close reading of the PSIEP reports and the subsequent developments in EPS and NISP, it is fairly clear that EPS and NISP were not closely tied to the wealth of detail contained in the PSIEP reports.

In other words, although PSIEP covered the whole range of communications, channels, and users in psychology and related fields, the results were not incorporated into the design stages of EPS and NISP. The focus of attention following the completion of PSIEP was the modification of the publication system in psychology, especially that controlled by the APA. The changes in the formal system of psychology are small when compared with the areas covered by PSIEP, and fairly simple when compared with the complexities described in PSIEP reports, especially the complex interaction between formal and informal communications. However, although the changes effected may have touched upon only a few aspects of information flow, they have nevertheless been radical changes and may turn out to be very far reaching.

Now that the data from INFROSS have been analysed and fully reported, it is a challenge to the research that follows on from INFROSS - research towards the Design of Information Systems in the Social Sciences (DISISS) - to make use of INFROSS data in design stages, especially in setting up and testing experimental information services.

4.7 Future directions

In the main INFROSS has achieved what it set out to do. It has covered all the major social sciences and provided much data about all aspects of requirements for formal information communication and, to a lesser extent, informal communication. This would have been a much more costly and unwieldy operation if each social science discipline had mounted its own user studies, because many of the results would not have been comparable from one study to another. Menzel (1966), Herner and Herner (1967), and Paisley (1968) have all pointed to the lack of accumulation and comparability of the results of user studies. INFROSS has avoided the proliferation of small-scale and piecemeal studies in social sciences, at some sacrifice of depth, and has been able to identify areas that require further research.

It is doubtful whether further studies along the lines of the established user survey would yield much additional data for the planning of social science information systems: the point of diminishing

returns is soon reached. However, user studies do not necessarily cease at the time design begins. Feedback from users is required in the refinement of both the prototype stages of information systems development and in the operation of services. A change in emphasis is quite apparent in the material that now goes into the chapter on information needs and uses in the Annual Review of Information in Science and Technology. The chapter on user studies by Lipetz in the 1970 volume, for example, includes a large number of references that only a few years ago would not have fallen within the domain of user studies - studies that deal with use patterns as recorded by citations and frequency counts, rather than studies relying entirely on data collected from interviews and questionnaires.

REFERENCES

ALLEN, T.J. Information needs and uses. Annual Review of Information Science and Technology, 1969, 4, 3-29.

ALLEN, T.J. Organizational aspects of information flow in technology. Aslib Proceedings, 1968, 20, 433-454.

ALLEN, T.J. The diffusion of technological information. Proceedings of the 20th National Conference on the Administration of Research. (Miami, Florida, October 1966), Denver Research Institute, University of Denver, 1967. pp. 111-122.

ALLEN, T.J. & COHEN, S.I. Information flow in research and development laboratories. Administrative Science Quarterly, 1969, 14(1), 12-19.

ALLEN, T.J. & GERSTBERGER, P.G. Criteria for selection of an information source. Alfred P. Sloan School of Management, M.I.T., Cambridge, Mass., 1967.

AMERICAN PSYCHOLOGICAL ASSOCIATION. Reports of the American Psychological Association's Project on Scientific Information Exchange in Psychology. Volumes 1,2,3. American Psychological Association, Washington, D.C., 1963, 1965, 1969.

BARKER, A. & RUSH, M. The Member of Parliament and his information. Allen & Unwin, London, 1970.

BATH UNIVERSITY OF TECHNOLOGY. Investigation into information requirements of the social sciences: report on the preliminary stage. Bath University of Technology Library, April 1968. [Mimeographed report]

BATH UNIVERSITY OF TECHNOLOGY. Experimental information officer in the social sciences: report to OSTI on work carried out in 1969. Bath University of Technology Library, February 1970. [Mimeographed report]

BATH UNIVERSITY OF TECHNOLOGY. Experimental information service in the social sciences: report on work carried out in 1970. Bath University of Technology Library, January 1971. [Mimeographed report]

BERNAL, J.D. Preliminary analysis of pilot questionnaire on the use of scientific literature. In Report on the Royal Society Scientific Information Conference. The Royal Society, London, 1948. pp. 589-637.

BLOOM, M. The selection of knowledge from the behavioral sciences and its integration into social work curricula. J. of Education for Social Work, 1969, 5(1), 15-28.

BRITTAIN, J.M. Information and its users: a review with special reference to the social sciences. Bath University Press/Oriel Press, Bath/Newcastle upon Tyne, 1970.

BROWN, W.S., PIERCE, J.R. & TRAUB, J.F. The future of scientific journals. Science, 1967, 158, 1153-1159.

CARTER, M.P. Report on a survey of sociological research in Britain. Sociological Review, 1968, 16, 5-40.

CLARK, K.E. A critical examination of the national information system for psychology. American Psychologist, 1971, 26(4), 325-329.

COLE, S. & COLE, J.R. Scientific output and recognition: a study in the operation of the reward system in science. American Sociological Review, 1967, 32, 377-390.

DENNIS, W. Productivity among American psychologists. American Psychologist, 1954, 9, 191-194.

DEWS, J.D. & FORD, M.M. An investigation into existing documentation services in business studies. Manchester Business School, January 1969.

GARVEY, W.D. & GRIFFITH, B.D. Research frontier; APA project on scientific information exchange in psychology. J. counselling Psychol., 1963, 10, 297-302.

GARVEY, W.D. & GRIFFITH, B.D. Scientific information exchange in psychology. Science, 1964a, 146, 1655-1659.

GARVEY, W.D. & GRIFFITH, B.C. The structure, objectives and findings of a study of scientific information exchange in psychology. American Documentation, 1964b, 15, 258-267.

GARVEY, W.D. & GRIFFITH, B.D. Studies of social innovations in scientific communication in psychology. Amer. Psychol., 1966, 21, 1019-1036.

GARVEY, W.D. & GRIFFITH, B.C. Communication in a science: the system and its modification. In A. de Reuck & J. Knight (Eds.), Communication in science: documentation and automation. Churchill, London, 1967a.

GARVEY, W.D. & GRIFFITH, B.D. Scientific communication as a social system. Science, 1967b, 157, 1011-1016.

GARVEY, W.D. & GRIFFITH, B.C. Informal channels of communication in the behavioral sciences: their relevance in the structuring of formal or bibliographic communication. In E.B. Montgomery (Ed.), The foundations of access to knowledge: a symposium. Syracuse University Press, Syracuse, 1968.

GRIFFITH, B.C. & GARVEY, W.D. Systems in scientific information exchange and the effects of innovation and change. Proc. Amer. Documentation Institute, 1964, 1, 191-200.

HERNER, S. & HERNER, M. Information needs and uses in science and technology. Annual Review of Information Science and Technology, 1967, 2, 1-34.

KENNEY, R. The implications of the needs of users for the design of a catalogue: a survey at the International Labour Office. Journal of Documentation, 1966, 22(3), 195-202.

KINKADE, R.G. The experimental publication system: an aid to information system planning. American Psychologist, 1970a, 25(10), 925-936.

KINKADE, R.G. Summary of exploratory OCMD questionnaire. American Psychologist, 1970b, 25, 291-292.

LINE, M.B. The social scientist and his information needs. In Library Association - Reference, Special and Information Section, Proceedings of the 16th Annual Conference, Durham, 1968. London, The Section, 1968. Pp.10-18.

LINE, M.B. Information requirements in the social sciences: some preliminary considerations. Journal of Librarianship, 1969, 1(1), 1-19.

LIPETZ, B-A. Information needs and uses. Annual Review of Information Science and Technology, 1970, 5, 3-32.

MARGOLIS, J. Citation indexing and evaluation of scientific papers. Science, 1967, 155, 1213-1219.

MENZEL, H. Informal communications in science: its advantages and its formal analogues. In E.B. Montgomery (Ed.), The foundations of access to knowledge: a symposium, Syracuse University Press, Syracuse, 1968.

MENZEL, H. Information needs and uses in science and technology. Annual Review of Information Science and Technology, 1966, 1, 41-69.

MENZEL, H. Can science information needs be ascertained empirically? In L. Thayer (Ed.), Communications: concepts and perspectives. Spartan Books, Washington, D.C., 1967, pp. 279-295.

MERTON, R.K. Modern men of science. McGraw-Hill, New York, 1966.

PAISLEY, W.J. The flow of (behavioral) science information: a review of the research literature. Institute for Communication Research, Stanford University, Palo Alto, 1965.

PAISLEY, W.J. Information needs and uses. Annual Review of Information Science and Technology, 1968, 3, 1-30.

PARKER, E.B., LINGWOOD, D.A. & PAISLEY, W.J. Communication and research productivity in an interdisciplinary behavioral science research area. Institute of Communications Research, Stanford University, 1968.

PRICE, D.J. de S. Science since Babylon. Yale University Press, New Haven, 1961.

PRICE, D.J. de S. & BEAVER, D. De B. Collaboration in an invisible college. American Psychologist, 1966, 21, 1011-1018.

SHILLING, C.W., BERNARD, J. & TYSON, J.W. Informal communication among bioscientists. George Washington University, Biological Sciences Communication Project, Washington, 1964.

SWIFT, D.F. & WINN, V. The "Sociology of education abstracts" research project. Education Libraries Bulletin, 1970, 38, 12-19.

UNITED STATES NATIONAL ACADEMY OF SCIENCE/SOCIAL RESEARCH COUNCIL/ BEHAVIORAL AND SOCIAL SCIENCE SURVEY COMMITTEE. The behavioral and social sciences: outlook and needs. Prentice-Hall, London, 1969.

UNITED STATES NATIONAL RESEARCH COUNCIL/COMMITTEE ON INFORMATION IN THE BEHAVIORAL SCIENCES. Communication systems and resources in the behavioral sciences. National Academy of Sciences, Washington, D.C., 1967.

VAN COTT, H.P. National information system for psychology: a proposed solution for a pressing problem. American Psychologist, 1970, 25(5), i-xx.

WHITE, B. Planners and information: a report of an investigation into information provision in town and country planning. Library Association, London, 1970.

WHITLEY, R. & FROST, P.A. The measurement of performance in research. Human Relations, 1971, 24(2), 161-178.

WINN, V.A. Access to information in the sociology of education: an information paper. Unpublished paper, Department of Education, Oxford University, 1969.

WINN, V.A. Information needs in the sociology of education: report of discussions amongst college of education lecturers. Unpublished paper, Department of Education, Oxford University, 1969.

WINN, V.A. A case study in the problems of information processing in a social science field: the OSTI-SEA project. Aslib Proceedings, 1971, 23(2), 76-88.

APPENDIX A

QUESTIONNAIRE

Investigation into Information Requirements of the Social Sciences

Bath University of Technology

1968

QUESTIONNAIRE

Please answer as much of the questionnaire as you can. If a question or section is quite irrelevant to you, please indicate this by writing NR against it. If any of the pre-coded questions do not allow you to give full answers, please feel free to add comments.

TICK BOXES AS APPLICABLE

In order to enable us to follow up selected respondents by interview, we ask you to put your name to the form. You are however assured that all the information you suppl: will be treated in absolute confidence.

1a. Name _____ Mr./Mrs./Miss

b. Age group:

21 - 30	☐
31 - 40	☐
41 - 50	☐
51 -	☐

2. Academic and professional qualifications:

Degree or qualification	Date taken	Subject(s)

3a. Institution where currently employed:

_____

b. Date you joined it: _____

c. Status: _____

d. Year you were appointed to your present status or post: _____

e. Year you first entered teaching or research: _____

For office use only

1a. 1 2 3 9

1b. 1 2 3 4 . . . 8 9

2. 1 2 3 4 5 6 7 8 9

1 2 3 4 5 6 7 8 9

1 2 3 4 5 6 7 8 9

3a. 1 2 3 4 5 6 7 8 9

3b.

3c. 1 2 3 4 5 6 7 8 9

3d.

3e.

If you are engaged currently in research, or have completed a piece of research in the last six months, please fill in the whole form. If this does not apply to you, please turn to question 60.

RESEARCH NEEDS

For office use only

4. Please state briefly the exact nature of the research in which you are involved or engaged or, if you are not involved at the moment, which you have completed in the last six months. If you are involved in more than one project, please select one only (it does not matter which).

4. Y X O
1 2 3
4 5 6
7 8 9

5. At what date did you begin active work on this project?

month ____ year ____

5.

6a. Are you conducting it

alone? ☐
in conjunction with others? ☐
if so, how many? _____

6a. 1 2 3
4 5 6
. 8 9

b. and what is your status in the research?

principal investigator or director ☐
research fellow or assistant ☐
other (specify) _____ ☐

6b. 1 2 3
4 . .
. 8 9

7. Approximately how many hours in an average week are you able to devote to your research?

If in a university or college { term _____ hours / vacation _____ }

If elsewhere _____ hours

7. Y X O
1 2 3
4 5 6
7 8 9

8a. Is there a time limit on the completion of your research?

Yes ☐
No ☐

8a. 1 2 .
. . .
. 8 9

b. If so, when?

month _____ year _____

8b.

c. By whom is the time limit imposed?

The institution where you work ☐
A granting body ☐
Publisher ☐
Yourself ☐
Other ☐
If so, by whom?
_____

8c. 1 2 3
4 5 6

9. How have you actually set about your research? If you can state the various stages chronologically, it will be helpful.

See examples on next two pages

For office use only

9. Y X O
1 2 3
4 5 6
7 8 9

Y X O
1 2 3
4 5 6
7 8 9

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

10. Would you please outline briefly any special methodology you are using in your research?

10. Y X O
1 2 3
4 5 6
7 8 9

11. Please list briefly, with references, any articles relating to this research that you have had published in the last three years:

11. 1 2 3
4 5 6
7 8 9

QUESTION 9. EXAMPLES OF RESEARCH PROFILES

A. ECONOMETRICS: research involving the evaluation of statistics collected by others

"Regional Economic Planning"

(An examination of regional economic growth - an attempt to calculate the "balance of payments" as between regions, and the relationship between input and output per head on a regional basis)

Procedure:

1. Collection of all available regional statistics.
2. Determination of different employment rates, working on three specific years.
3. Examination of regional production figures where available.
4. Examination of non-financial regional statistics such as car-ownership and unemployment, and the conversion of these to monetary terms where possible.
5. Collation of figures thus produced, and production of report.

Problems:

a) General problem when working on statistics compiled by other people: interpretation is made more difficult by the fact that one does not usually know how any particular statistic was originally calculated.

b) Different Ministries define regions in different ways, which means that such regional statistics as do exist are difficult to collate.

c) Statistics on services at regional level, as opposed to goods, are virtually non-existent.

d) The Census of Production for 1954 uses a different classification of industries from that employed in 1948 - this makes comparison between the two editions difficult.

e) Publication of major economic surveys is often slow - the results of the Census of Production made in 1963 are still not available in 1967.

f) Unpublished statistics held by Government Departments could be very valuable, but are not always available.

B. POLITICS: research using historical materials and methods

"The growth of party discipline in Parliament, 1880 - 1905"

Procedure:

1. A fairly unsystematic literature-search to locate some of the material that had already been written (for background reading).
2. A search through the division-lists of five Parliamentary sessions during the period. Hansard was used for 1903 - the others are not reported in the Hansard of the time, and had to be consulted in the British Museum.

   Problem: There are no party labels, which means that the researcher must rely to a large extent on his own knowledge of personalities in the period.

3. Identification, through Hansard, of the issues involved in each division.

4. Identification of the significant cleavages in voting, and the most important "rebels" involved.

5. Lists of the "rebels" in the Parliament of the time, and accumulation of background knowledge.

   Problem: Biographical materials in this period are inadequate; not only are they comparatively few in number, but they are often poor in quality, concentrating on what are, for the researcher, irrelevancies - (e.g. interesting personal data, rather than information about occurrences in the House of Commons).

6. Work on methods of Party discipline in the period, principally on the workings of the Whip's Office (background work on organisation etc.) and Patronage (particularly legal - culled from the Law List and the London Gazette, though the latter was not much use).

7. Further and more detailed work on voting - examination of voting in Standing Committees.

   Problem: Could not find voting figures for Standing Committees in 1883, the year of the inception.

8. Attempt to trace the growth of pressure on M.P.s from their constituencies. Involved an examination of the constituencies which the "rebels" represented, and particularly involved searching through local newspapers of the period.

9. (At present) Evaluation of the data obtained, in preparation for writing-up.

C. SOCIOLOGY/EDUCATION: Research using statistical and survey methods

"Young people in industry: selection, training, attitudes and development."

Procedure:

1. Literature-search for background material, and planning of the research. The project is an attempt to discover the relationship between school record and the career-guidance given by the Youth Employment Service, and the actual performance of the sample during the first two years of work.

2. Drawing-up of sampling frame. Project will involve three separate samples:

   a) a group in their last year at school
   b) a group in their first year at work
   c) a group in their second year at work.

3. Establishing contact with bodies who will be able to assist in the research, especially:

   a) Local Youth Employment Service
   b) the Technical Colleges attended on day-release by those of the sample who are working
   c) the Engineering and Industrial Training Board
   d) local branches of the Ministry of Labour,

4. (At present) Work on local Ministry of Labour records.

5. Interviewing of sample, using structured interview - particular concern with attitudes to work.

6. Evaluation of survey data and material collection from Ministry of Labour and school records.

7. Writing-up.

N.B. You will probably find the questions on the following few pages difficult. Please do the best you can with them, even if your ratings are only a rough approximation.

For office use only

12. What are the "raw materials" of your current research? (Please mark all relevant items)

12. 1 2 3 4 5 6 7 8 9

1. Unpublished documents (archives, unpublished survey data, etc.) ☐

2. Published documents (books, periodicals government publications, newspapers, etc.) (N.B. Mark this item only if you use this as primary research material, not if you use it e.g. as a vehicle for informing yourself of previous experiments or surveys) ☐

3. Experiment and/or observation carried out by yourself or under your direction ☐

4. Interview or questionnaire survey conducted by yourself or under your direction ☐

5. Mathematical model or computer simulation ☐

6. Other ☐
please specify: _____

13. Please list the above categories, to the best of your ability, in order of their importance for your current research, using the numbers in the left column above.

13.

Order of importance	Source
1. (most important)	
2.	
3.	
4.	
5.	
6. (least important)	

1.
2.
3.
4.
5.
6.

14. What disciplines or subjects, other than the one central to your research, do you see as potentially relevant or able to contribute to your research?

14. Y X O 1 2 3 4 5 6 7 8 9

15. Please rate, as best you can, each of the following kinds of information according to the extent of your use in your current research.

For office use only

15.

	ring nos. as appropriate not used → most used	
Historical (i.e. relating to historical events)	0 1 2 3 4 5 6 7 8 9	1.
Descriptive (e.g. Marriage ceremonies of an African tribe, social life in a mining village)	0 1 2 3 4 5 6 7 8 9	2.
Statistical (i.e. actual statistics or numerical data)	0 1 2 3 4 5 6 7 8 9	3.
Methodological (indications or examples of methods or approaches which might be applicable to your research)	0 1 2 3 4 5 6 7 8 9	4.
Conceptual (theories, ideas, philosophical frameworks, etc.)	0 1 2 3 4 5 6 7 8 9	5.

N.B. These categories are not intended to be mutually exclusive: e.g. the same information can be both historical and statistical.

16. And please rate them according to their importance for your current research:

16.

(It is assumed that you would not use any of the above categories unless it was essential to you, but the extent of your use may not be the same as the prominence it has in your work; for example you may read a great deal of historical material, but statistics may be of more crucial importance to you.)

	not important → most important	
Historical	0 1 2 3 4 5 6 7 8 9	1.
Descriptive	0 1 2 3 4 5 6 7 8 9	2.
Statistical	0 1 2 3 4 5 6 7 8 9	3.
Methodological	0 1 2 3 4 5 6 7 8 9	4.
Conceptual	0 1 2 3 4 5 6 7 8 9	5.

17. Information can be made available in various basic physical forms, or in other ways. Please rate, as best you can, each of the following according to the extent of your use during your current research by ringing the appropriate number.

PHYSICAL FORMS	not used → most used	For office use only
		17.
1. Periodicals	0 1 2 3 4 5 6 7 8 9	1.
2. Books (monographs) or pamphlets	0 1 2 3 4 5 6 7 8 9	2.
3. Books (collections such as conference proceedings, collected readings in a subject etc.)	0 1 2 3 4 5 6 7 8 9	3.
4. Research reports	0 1 2 3 4 5 6 7 8 9	4.
5. Theses, dissertations	0 1 2 3 4 5 6 7 8 9	5.
6. Newspapers (daily or weekly)	0 1 2 3 4 5 6 7 8 9	6.
7. Government publications and other official documents (e.g. U.N.)	0 1 2 3 4 5 6 7 8 9	7.
8. Microcopies (whether microfilm reels or strip, or microcards)	0 1 2 3 4 5 6 7 8 9	8.
9. Maps	0 1 2 3 4 5 6 7 8 9	9.
10. Films (pictorial, not films of printed material)	0 1 2 3 4 5 6 7 8 9	10.
11. Other pictorial (e.g. photographs or illustrations)	0 1 2 3 4 5 6 7 8 9	11.
12. Tape recording or other sound recording	0 1 2 3 4 5 6 7 8 9	12.
13. Video-tape	0 1 2 3 4 5 6 7 8 9	13.
14. Computer printouts (e.g. of statistical data)	0 1 2 3 4 5 6 7 8 9	14.
15. Other please specify: _____	0 1 2 3 4 5 6 7 8 9	15.
OTHER FORMS		
16. Radio or television	0 1 2 3 4 5 6 7 8 9	16.
17. Conferences	0 1 2 3 4 5 6 7 8 9	17.
18. Colleagues in your own institution (by discussion etc.)	0 1 2 3 4 5 6 7 8 9	18.
19. Colleagues or experts elsewhere (other than at conferences, i.e. by correspondence or discussion)	0 1 2 3 4 5 6 7 8 9	19.
20. Other please specify: _____	0 1 2 3 4 5 6 7 8 9	20.

18a. Of the PHYSICAL FORMS you have used, which TWO do you find easiest or most convenient to use? (Use numbers in left margin) (This question is concerned with the usability of the forms, not their accessibility.)

1. _____

2. _____

b. And which two least convenient?

1. _____

2. _____

c. Could you say briefly why you find them least convenient?

1.

2.

For office use only

18a.

1.

2.

18b.

1.

2.

18c. (i)
1 2 3
4 5 6
7 8 9

18c. (ii)
1 2 3
4 5 6
7 8 9

19a. Which forms (physical and other) have you used in your current research for each of the various types of information listed in question 15?

Type of information	Forms used (use numbers in left margin on facing page)
Historical	
Descriptive	
Statistical	
Methodological	
Conceptual	

19a.

1.

2.

3.

4.

5.

b. Please underline the form (or forms) you consider most important (qualitatively) for each type of information, confining your answer to your current research.

19b.

1.

2.

3.

4.

5.

20. There are several methods of discovering references to relevant published information. Please rate, as best you can, the following according to their usefulness for your current research:

For office use only

20.

	not useful → most useful	
1. Abstracts or indexes (e.g. Sociological Abstracts)	0 1 2 3 4 5 6 7 8 9	1.
2. Consulting known expert or authority	0 1 2 3 4 5 6 7 8 9	2.
3. Discussion with colleagues in your own institution	0 1 2 3 4 5 6 7 8 9	3.
4. Discussion or correspondence with acquaintances elsewhere	0 1 2 3 4 5 6 7 8 9	4.
5. Library catalogues	0 1 2 3 4 5 6 7 8 9	5.
6. Searching library shelves: in your own institution	0 1 2 3 4 5 6 7 8 9	6.
7. in other libraries	0 1 2 3 4 5 6 7 8 9	7.
8. Consulting librarian	0 1 2 3 4 5 6 7 8 9	8.
9. Specialist bibliographies, published as separate items (e.g. Bibliography of rural land economy, by D.R. Denman)	0 1 2 3 4 5 6 7 8 9	9.
10. Bibliographies or references in books or periodicals	0 1 2 3 4 5 6 7 8 9	10.
11. Book reviews	0 1 2 3 4 5 6 7 8 9	11.
12. Other please specify: _____	0 1 2 3 4 5 6 7 8 9	12.

21a. Do you use the same methods for obtaining references in the central area of your research and in marginal or peripheral areas?

Yes ☐
No ☐

21a.

1 2 .
. . .
. 8 9

b. If "No", please indicate the methods where your rating would be different for marginal areas, using the numbers in the left margin of question 20.

21b.

Method	Rating

Method	Rating

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.

22. Do you have photocopies made of papers, tables, or articles of interest to your current research?

Frequently ☐
Occasionally ☐
Rarely or never ☐

For office use only

22.
1 2 3
. . .
. 8 9

23. Do you keep a personal file of references? Yes ☐ No ☐

If so, in what form? (e.g. punched cards, etc.)

23.
1 2 3
4 5 6
7 8 9

24. If you use films, sound recordings, or other "non-book" materials, how (briefly) do you find out about their existence?

24.
1 2 3
4 5 6
7 8 9

25a. What abstracting and indexing journals have you used for your current research? (Please list all that you can remember, each on a separate line)

	Accessible in your own or nearby library	
	Yes	No
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

25a.

Y X O
1 2 3
4 5 6
7 8 9

Y X O
1 2 3
4 5 6
7 8 9

Y X O
1 2 3
4 5 6
7 8 9

Y X O
1 2 3
4 5 6
7 8 9

Y X O
1 2 3
4 5 6
7 8 9

b. Please name any others you know of, which you might have used if they had been more accessible:

For office use only

25b.

c. Name any of the above which you have found particularly difficult or inconvenient to use, indicating briefly the reasons:

25c.

26. When assessing the relevance of references for your research, how would you rate abstracts as opposed to simple author-and-title entries?

26. 1 2 3 . . . . 8 9

About the same as author-and-title entries ☐
Rather more satisfactory ☐
Much more satisfactory ☐

27a. When searching in abstracting or indexing journals for subject entries related to your research, do you have difficulty in finding appropriate index entries?

27a. 1 2 3 . . . . 8 9

Yes ☐
No ☐

b. If "Yes", is it because:

27b. 1 2 3 . . . . 8 9

you find it difficult to put into convenient terms the subjects or concepts in which you are interested? ☐

you cannot easily find the terms the indexer has used for these subjects or concepts? ☐

both? ☐

28. In the pure and applied sciences, if you know of a certain article relevant to your research, you can now find out what articles have subsequently cited it. This may be a more effective way of finding material on a subject than the conventional abstracting or indexing journal, since it avoids the problems of classification and terminology. Do you consider that this sort of tool (a "citation index") would be, or would have been, useful to you in your research?

Considerably useful ☐
Moderately ☐
Not very ☐
Not at all ☐

For office use only

28. 1 2 3
4 . .
. 8 9

29a. Have you had difficulty or inconvenience in using books through inadequate indexing? (This refers to book indexes, not to indexes to periodical literature)

Yes ☐
No ☐

If so, is this because of:

	Often	Occas.	Rarely
insufficiently comprehensive indexing			
poor choice of terms or arrangement			
no index at all			

29a.
Y X O
1 2 3
4 5 6
7 8 9

b. In the light of your experience, have you any suggestions as to how indexes could be improved?

29b.
1 2 3
4 5 6
7 8 9

30a. Please name any library catalogues (whether on cards or slips, or in book form), and, if you can, any printed bibliographies (published separately, not as parts of monographs) that you have used for your current research:

30a.
Y X O
1 2 3
4 5 6
7 8 9

b. You may well also have used several bibliographies whose titles you cannot remember. Would you please say approximately how many, with a rough indication of the subjects covered by them?

30b.
Y X O
1 2 3
4 5 6
7 8 9

31. Please comment on their usefulness, limitations, or difficulty to use, giving examples where possible:

For office use only

(a) Printed bibliographies

Comprehensiveness:

31.(a)
1 2 3
4 5 6
7 8 9

Arrangement:

1 2 3
4 5 6
7 8 9

Annotation (or lack of it):

1 2 3
4 5 6
7 8 9

Other comments:

1 2 3
4 5 6
7 8 9

(b) Library catalogues

Arrangement (filing):

31.(b)
1 2 3
4 5 6
7 8 9

Extent of detail (whether too much or too little):

1 2 3
4 5 6
7 8 9

Other comments:

1 2 3
4 5 6
7 8 9

32. How many volumes (approximately) directly related to your current research do you own personally?

Fewer than 10	☐
11 - 25	☐
26 - 50	☐
51 - 100	☐
more than 100	☐

33. What libraries have you used for your current research, whether for borrowing or consultation? Please list them <u>in order of their usefulness</u> to you.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

34. What proportion (roughly) of the books and periodicals you have used for your current research have you borrowed from other libraries?

%	
0	☐
1 - 10	☐
11 - 25	☐
26 - 50	☐
51 - 75	☐
76 - 90	☐
more than 90	☐

35. How adequate for your current research is the book-stock of <u>your own institutions</u>'s library?

Sufficient for all your requirements	☐
most of your requirements	☐
some of your requirements	☐
few of your requirements	☐
none of your requirements	☐

For office use only

32.
1 2 3
4 5 6
. 8 9

33.
1.
2.
3.
4.
5.
6.

34.
1 2 3
4 5 6
7 8 9

35.
1 2 3
4 5 .
. 8 9

36a. "Accidental discovery" is a common experience in research. How often have you picked up material for your current research by accident or by purposeful browsing?

	Often	Occas-ionally	Rarely or never
By wandering along library shelves			
By scanning current periodicals			
By looking up a given reference and spotting something else at the same time			
By receipt of offprints or pamphlets			
In book shops			
In conversation with colleagues			
In other ways please specify:			

b. Is material found in this way important?

	Often	Occas-ionally	Rarely or never
Directly important to your research			
Marginally important to your research			
Indirectly important, e.g. in suggesting new lines, approach or a wider frame of reference			
Not of relevance to your immediate research, but within your general range of research interests			

c. Can you give an example or two of information found by browsing which you consider to be of importance?

37. Do you generally need to use books in conjunction with one another, or does it serve your purposes equally well if they are available consecutively?

In conjunction ☐
Consecutively ☐

For office use only

36a.
Y X O
1 2 3
4 5 6
7 8 9

Y X O
1 2 3
4 5 6
7 8 9

36b.
1 2 3
4 5 6
7 8 9

1 2 3
4 5 6
7 8 9

36c.
Y X O
1 2 3
4 5 6
7 8 9

37.
1 2 .
. . .
. 8 9

38. Do you require access for your current research to any books or periodicals:

published before 1800 ☐
" 1801 - 1850 ☐
" 1851 - 1900 ☐
" 1901 - 1918 ☐
" 1919 - 1930 ☐
" 1931 - 1945 ☐

For office use only

38.
1 2 3
4 5 6
. 8 9

---

39. How important is it to your current research that you should know very soon after publication what is being published?

Very ☐
Moderately ☐
Not very ☐

39.
1 2 3
. . .
. 8 9

40. How do you keep informed of what is being currently published in your field of research interest?

40.
1 2 3
4 5 6
7 8 9

41. What delay is generally tolerable (i.e. extreme cases excepted) to you between the publication of an article or paper in print and its appearance in a published indexing or abstracting journal such as Sociological Abstracts and Social Sciences and Humanities Index?

Up to one month ☐
One to three months ☐
Three to six months ☐
Six months to one year ☐
Over one year ☐

41.
1 2 3
4 5 .
. 8 9

42a. Do you try to keep track of current research in progress of relevance to you?

Yes ☐
No ☐

42a.
1 2 .
. . .
. 8 9

b. If you do, could you explain briefly how?

42b.
Y X O
1 2 3
4 5 6
7 8 9

43. Please outline any special problems you have experienced in keeping track of research in progress.

For office use only

43.
Y X O
1 2 3
4 5 6
7 8 9

---

44. What languages do you read?

44.
Y X O
1 2 3
4 5 6
7 8 9

45. Do you regularly scan literature in these languages? (e.g. by looking through current periodicals)

Yes ☐
No ☐

45.
1 2 .
. . .
. 8 9

46. If you come across a reference to, or abstract of, an item which appears to be relevant to your research, and it is in a foreign language that you can read, do you have any reluctance to look up the original?

No more than if it were in English ☐
Slightly more " " " " " ☐
Considerably more " " " ☐

46.
1 2 3
. . .
. 8 9

47. If you come across a reference (not an abstract) to an item which you believe to be relevant, and it is in a foreign language that you do not read, what do you do?

47a.
1 2 3
4 5 6
7 8 9

(a) If the original is easily accessible:

	Usually	Only if believed to be very important
Try to get it translated		
Try to get the gist of it yourself		
Search for a summary or abstract		
Ignore it		

(b) If the original is not easily accessible:

	Usually	Only if believed to be very important
Ignore it		
Search for a summary or abstract		
Try to obtain on inter-library loan (i) to get the gist yourself		
(ii) to get it translated		

47b.
1 2 3
4 5 6
7 8 9

48. Was your original choice of research subject affected by what you believed to be the amount of English-language material on the subject? (e.g. were you less likely to choose a subject in which there was a high proportion of foreign-language material?)

Yes ☐
No ☐

For office use only

48.
1 2 .
. . .
. 8 9

49. Do you consider that your research has been restricted or constrained in any way because of the language problem?

Not at all ☐
To a small extent ☐
Moderately ☐
Substantially ☐

49.
1 2 3
4 . .
. 8 9

---

50. Do you discuss your work with your colleagues in your own institution?

Yes ☐
No ☐

50.
1 2 .
. . .
. 8 9

51a. Do you attempt to keep in touch with colleagues in other institutions?

Yes ☐
No ☐

51a.
1 2 .
. . .
. 8 9

b. If "yes", do you attempt to do this by:

exchange of offprints ☐
circulation of unpublished MSS ☐
correspondence ☐
"social" contacts (e.g. personal visits, telephone etc.) ☐

51b.
1 2 3
4 . .
. 8 9

52. What professional conferences have you attended in the last twelve months? Please indicate for each whether national (N) or international (I)

52.
1 2 3
4 5 6
7 8 9

53a. If you did attend any conference, did you pick up any information relevant to your research?

of central relevance ☐
of peripheral relevance ☐

b. Was it from:

actual papers given ☐
discussions ☐
informal contacts? ☐

For office use only

53a. 1 2 . . . . 8 9

53b. 1 2 3 . . . 8 9

---

54. Please rate the following according to their value as a stimulus or source of new ideas for your current research:

	no value → most value	
Research itself (your own)	0 1 2 3 4 5 6 7 8 9	1.
Teaching	0 1 2 3 4 5 6 7 8 9	2.
Discussions with colleagues	0 1 2 3 4 5 6 7 8 9	3.
Reading	0 1 2 3 4 5 6 7 8 9	4.
Conferences	0 1 2 3 4 5 6 7 8 9	5.
Other please specify: _____	0 1 2 3 4 5 6 7 8 9	6.

54.

55a. Do you deliberately delegate any of your searching for references or materials to anyone else?

Yes ☐
No ☐

b. To what extent?

Extensively ☐
Partially ☐

55a. 1 2 . . . . 8 9

55b. 1 2 . . . . 8 9

56a. If you could have at hand a subject specialist with a detailed knowledge of bibliographies, abstracts and indexes, libraries, etc., how far would you wish or be prepared to delegate searching to him?

Extensively ☐
Partially ☐
Not at all ☐

b. If "not at all", could you briefly say why?

56a. 1 2 3 . . . 8 9

56b. 1 2 3 4 5 6 7 8 9

57a. Have any information problems of special difficulty or importance arisen during your current research?

Yes ☐
No ☐

b. If so, please indicate briefly their nature:

c. Were you able to solve them

	as quickly as desired	less quickly than desired
to your full satisfaction?		
only partially?		
not at all?		

58. Have you ever come across information too late to be of maximum use to you, even though it existed before?

Never ☐
Occasionally ☐
Frequently ☐

59. Have you any additional general comments you would like to make on the problems of finding out what information exists, whether it is published or not?

For office use only

57a.
1 2 3
. . .
. 8 9

57b.
Y X O
1 2 3
4 5 6
7 8 9

57c.
1 2 3
4 5 6
. 8 9

58.
1 2 3
. . .
. 8 9

59.
Y X O
1 2 3
4 5 6
7 8 9

Are you engaged currently in teaching? If "Yes", please continue to complete the form. If "No", please turn to question 68 at the very end of the form.

Yes ☐
No ☐

TEACHING NEEDS

The preceding part of this questionnaire relates to research and the information needs that arise in the course of it. This much shorter part concerns the information you need in order to teach students (e.g. the literature you need to prepare for teaching, not the literature you expect your students to read).

60. Are you currently, or have you recently been, involved in research?

Yes ☐
No ☐

For office use only
60. 1 2 . . . . 8 9

61. What subjects are you teaching in the current academic year?

61. Y X O 1 2 3 4 5 6 7 8 9

62. How many hours a week in term on average do you teach?

_____ hours

62.

63. Please rate each of the following according to their usefulness

63.

PHYSICAL FORMS	ring nos. as appropriate: not useful → most useful	
1. Periodicals	0 1 2 3 4 5 6 7 8 9	1.
2. Books (monographs) or pamphlets	0 1 2 3 4 5 6 7 8 9	2.
3. Books (collections such as conference proceedings, collected readings in a subject, etc.)	0 1 2 3 4 5 6 7 8 9	3.
4. Research reports	0 1 2 3 4 5 6 7 8 9	4.
5. Theses	0 1 2 3 4 5 6 7 8 9	5.
6. Newspapers (daily or weekly)	0 1 2 3 4 5 6 7 8 9	6.
7. Government publications and other official documents (e.g. U.N.)	0 1 2 3 4 5 6 7 8 9	7.
8. Microcopies (whether microfilm reels or strip, or microcards)	0 1 2 3 4 5 6 7 8 9	8.
9. Maps	0 1 2 3 4 5 6 7 8 9	9.
10. Films (pictorial, not films of printed material)	0 1 2 3 4 5 6 7 8 9	10.
11. Other pictorial (e.g. prints or illustrations)	0 1 2 3 4 5 6 7 8 9	11.

		For office use only
12. Tape recordings or other sound recordings	0 1 2 3 4 5 6 7 8 9	
13. Video-tape	0 1 2 3 4 5 6 7 8 9	63.
14. Computer printouts (e.g. of statistical data)	0 1 2 3 4 5 6 7 8 9	12.
15. Other please specify:	0 1 2 3 4 5 6 7 8 9	13. 14. 15.
OTHER FORMS:		
16. Radio or television	0 1 2 3 4 5 6 7 8 9	16.
17. Conferences	0 1 2 3 4 5 6 7 8 9	17.
18. Colleagues in your own institution	0 1 2 3 4 5 6 7 8 9	18.
19. Colleagues or experts elsewhere (other than at conferences)	0 1 2 3 4 5 6 7 8 9	19.
20. Other please specify:	0 1 2 3 4 5 6 7 8 9	20.

64. What methods do you use of finding published information relevant to your teaching subjects? Please rate, as best you can, according to usefulness: — 64.

	not useful → most useful	
1. Published bibliographies, abstracts	0 1 2 3 4	1.
2. Colleagues (local or elsewhere)	0 1 2 3 4	2.
3. Searching library shelves	0 1 2 3 4	3.
4. Book reviews	0 1 2 3 4	4.
5. References in other books or journals	0 1 2 3 4	5.
6. Other please specify:	0 1 2 3 4	6.

65. How adequate for your teaching needs is the bookstock of your own institution's library? — 65.

Sufficient	for	all	your	requirements
"	"	most of	"	"
"	"	some of	"	"
"	"	few of	"	"
"	"	none of	"	"

1 2 3
4 5 .
. 8 9

66. Do you find that when searching for material in connection with your research, you find items of interest or importance for your teaching?

Often	☐
Occasionally	☐
Rarely or never	☐
Not doing research	☐

67. Your teaching presumably covers a much wider subject area than your research. How do you keep track of developments in this broader area?

68. Have you any general suggestions to make as to how the provision of information, and access to it, could be improved?

Date Completed:

For office use only

66.
1 2 3
. . .
. 8 9

67.
Y X O
1 2 3
4 5 6
7 8 9

Y X O
1 2 3
4 5 6
7 8 9

68.

Y X O
1 2 3
4 5 6
7 8 9

Y X O
1 2 3
4 5 6
7 8 9

Y X O
1 2 3
4 5 6
7 8 9

Y X O
1 2 3
4 5 6
7 8 9

INFROSS - Interview Schedule for Researchers

Personal details (as Questionnaire)

All research is based on and concerned with information in one form or another, whether you obtain it from a documentary source, by consulting a colleague, by generating your own data (e.g. by surveys), or by some other means. I would like to discuss with you several aspects of the problem of obtaining the information you require for your research.

I would like first to know what research you are currently involved in, and what stage you have reached in it.

Are you working on it alone, or as a member of a team?

Can you remember how you came to start work on this research, or what influenced you to take the direction you have?

Could we get down to fairly precise details of what you are actually working on at the moment?

Have you done any work on it in the last seven days?

If so, could you please say what you have done?

I would like especially to know what information relevant to your research you have gathered or obtained in the last seven days. I am thinking of all kinds of information - inspirational as well as factual, in documentary form or obtained in discussion with colleagues, whether deliberately sought or "accidentally" received.

Prompt: discussions with colleagues
references obtained (how? and were they followed up?)
correspondence with colleagues or contacts elsewhere
"accidental"

Could we go into rather more detail for the last 24 hours? This is to obtain a detailed picture of the information that comes to researchers, not all of it expected or sought.

Prompt: letters received
telephone calls
reading (what precisely?)
browsing (libraries, bookshops, etc.)

Would you care to enlarge on the chief sources from which you obtain new ideas or stimulus?

Is there any specific problem in your research (or in your other academic work, for that matter) with which you are concerned at the moment?

Could we go through the way you have tackled this, from the beginning?

Prompt: deliberate search?

use of abstracts or indexes or bibliographies (which?) (suggest obvious tools which are not mentioned by respondent)

systematic procedure?

I would like to follow up this question of indexes and abstracts for a bit, since they do constitute a large portion of the "formal" communication system. For example do you go to them readily and use them with ease?

Or do you feel some reluctance or difficulty?

Prompt: "usuability" (psychological barriers)

arrangement (alphabetical v. classified) (show specimens)

terminology (expressing need in searchable terms)

not wide enough coverage

Do you use them mainly for current "keeping up", or for searching retrospectively?

Or what do you use for these two categories of keeping yourself informed?

I would like to have your reaction to this (computer-produced bibliography)

How closely tied in is your research with the process of searching?

Would you miss much if someone else did the searching for you?

Prompt: do you come across important items when searching which you would not have looked for on their own?

Do you feel the need to evaluate material as you go along, or is this something that could be delegated to a trusted assistant?

Could you tell me what is the most recent book you have read relevant to your subject?

When did you read it?

How did you come across it?

And the most recent article?

When did you read it?

How did you come across it?

Do you feel that your research has been constrained in any way (either the actual choice of subject, or the direction it has taken) by extraneous factors?

Prompt: library facilities

volume of information

languages

Are there any additional comments, whether general or specific, you would like to make on the question of information?

Impressions of respondent

Systematic?

Persistence (in obtaining references)

Willingness to go to libraries elsewhere etc.

Breadth of approach (what other subjects or areas does he see as relevant?)

Informal: formal ratio

Date:

Bath University of Technology

Library

Maurice B. Line, *University Librarian*

Northgate House
Upper Borough Walls
Bath, Somerset
Telephone Bath 4276

May, 1968.

Your cooperation is asked in a survey of researchers and teachers in the social sciences, in connection with an investigation I am directing into information requirements of the social sciences. A brief statement of the nature and purpose of this investigation is attached; a rather fuller outline of some of the considerations that led to it can be seen in my article in the current SSRC Newsletter.

The questionnaire enclosed, which has been developed and tested through interviews and two pilot surveys, is being circulated to a large sample, with the object of providing a large quantity of comparable data over a wide range of research and teaching activities in different disciplines. It is the need to gather a large quantity of data that makes the use of a mail questionnaire unavoidable, although it is a very imperfect instrument for our purposes. Similar reasons explain its length, which we have reduced as much as possible, but for which I feel I should still apologise; to have covered less ground would have made additional inquiries necessary. The questionnaire will be followed up by interviews of a smaller sample, which should yield more valid and reliable data, as well as covering aspects of the information problem not covered in the questionnaire.

Some of the questions will be found difficult to answer with any precision, and precisely accurate answers are not expected: as stated above, a large body of comparable data is required, which "open" questions would not give us. Again, some questions greatly over-simplify the situation as shown in our preliminary interviewing. I realise that the pattern of research and information-seeking is hardly ever as tidy as the schedules would suggest, and that, in particular, some of the reference methods and tools mentioned have little relevance in certain types of research. Please complete the form as best you can; you may be assured that full account will be taken of these matters in the analysis and interpretation of results.

Some recipients will not regard themselves as social scientists. However, they will almost certainly use social science information of one kind or another, and in any case their answers would be appreciated, as they will be very useful for the purposes of comparison.

I hope you will find the time to complete the questionnaire, and return it to me in the enclosed envelope. The survey, with all its imperfections, is an essential part of the investigation, the ultimate aim of which is to see how far and in what ways the information system can be improved, so as to give social scientists a more effective service at the cost of less time and effort. By cooperating in this inquiry, therefore, you may be contributing indirectly to an improved service in the future to all social scientists, yourself included.

Yours sincerely,

Maurice B Line

Project Head

Bath University of Technology

Library

Maurice B. Line, *University Librarian*

Northgate House
Upper Borough Walls
Bath, BA1 5AL
Telephone Bath 4276

August, 1968.

Investigation into Information Requirements of the Social Sciences

Earlier in the summer I sent you a Questionnaire concerned with this investigation. In spite of one follow-up, the response is still disappointing. Some of the reasons for this are obvious. The length of the form is pretty intimidating, but as I have already explained, it could not have been shortened without the loss of important information. Some respondents, as I anticipated, were unhappy about the use of rating scales in some of the questions, but I can only give a reassurance that I am not proposing to extract mathematically precise information from these questions: the general information I wanted could unfortunately not have been obtained by less precise questions.

There are two additional reasons why some recipients of the questionnaire may have not returned it. The first is that some forms (perhaps as many as 200) were printed correctly but wrongly folded inside the cover, and this was not noticed until quite a few had been dispatched. The second is that the questionnaire was sent out at a time when all its recipients were likely to be very busy indeed. I am therefore sending you a copy of all the papers originally sent, in the hope that you will be able to find time now to complete the form. It really is very important that we have a good response, otherwise our attempt to state what improvements can be made in the information system will be based only on partial knowledge. May I also remind you again that the ultimate aim of the project is to save the time of all researchers?

I should add that although I asked for the names of respondents on the forms, in order to be able to interview selected persons, complete anonymity will be observed in the analysis and interpretation.

Yours sincerely

Maurice B. Line

Project Head

APPENDIX E

The capabilities of MVC

The MVC compiler is a General Survey Program designed for use on the University of London and SRC Atlas Computers. It is designed primarily to produce data tables from the individual cases of a survey, rather than for complicated statistical analyses. The standard format produced is a two-way table, with ratios added as required. Three-way tables are produced by generating a set of two-way tables, each two-way table relating to a subset of the total response, thus:

C_1	A_1	2	3	4
B_1				
2				
3				
4				

C_2	A_1	2	3	4
B_1				
2				
3				
4				

(etc.)

Where $A_{(1-4)}$, $B_{(1-4)}$, $C_{(1-n)}$ are multi-choice variables.

Ratio can be specified to any base. In the analysis of the INFROSS data, a base of 100 (producing percentages) has been used throughout.

Chi-squares can be produced quite simply, but the usefulness of the chi-square facility has been limited by the construction of the questionnaire and the number of open-ended questions included in it. The chi-square test can only be used to test the relationship of two variables each with more than at least two possible answers of which one, and one only, is correct. Thus, a variable such as:

HAIR_COLOUR: blonde, brown, black, red, other (e.g. bald).

can be used in a chi-square test as the choices are mutually exclusive, while a variable such as:

NEWSPAPER: Guardian, Times, Mirror, Sun, Express;

cannot, since the choices here are not mutually exclusive. Many of the questions in the INFROSS questionnaire are of the latter variety. It is possible, where only three choices are available, to derive new variables to be used in analysis, thus:

COLOUR: red, white, blue;

is used to derive a new set of mutually exclusive variables thus:

COLOURING: red, white, blue, red/white, red/blue, blue/white, red/white/blue;

It can be seen that this procedure is impracticable as soon as the number of variables rises above three, as the number of permutations and combinations possible becomes unwieldy. A chi-square performed on two sets of sixteen variables, for example, would be very unlikely to yield any meaningful result in terms of any hypothesis which one might wish to test.

The facilities for the calculation of means, standard deviations and correlations are again restricted by the nature of the data. These

tests can only be carried out on numerical data, and while it is a simple matter to convert data from a multiple-choice question into numeric form when the question is of this type:

VOLUMES OWNED: under 10, 11-50, 51-100, over 100

Such questions are rare in the INFROSS questionnaire, and a treatment of the data from such questions involving rigorous statistical analysis would have been inadvisable. It would have implied a degree of precision and objectivity which the data did not have. In any case, many of the more obviously useful tests, such as a rank correlation, have the same operating requirements as chi-square: that is, the variables to be correlated must be sets of mutually exclusive categories.

More complex statistical tests, such as factor analysis, multiple regression, and association analysis, are outside the capability of MVC.

It should be mentioned that MVC is a particularly cumbersome language. Each table specification has to be written out and punched in full; there are no standard subroutines or functions as there are in FORTRAN. This means that writing the program itself was exceedingly time-consuming.

APPENDIX F

The use of rating-scales

In the questionnaire originally sent out, rating-scales were used for several questions. The following questions employed sets of rating-scales from 0 (not used/important) to 9 (most used/important):

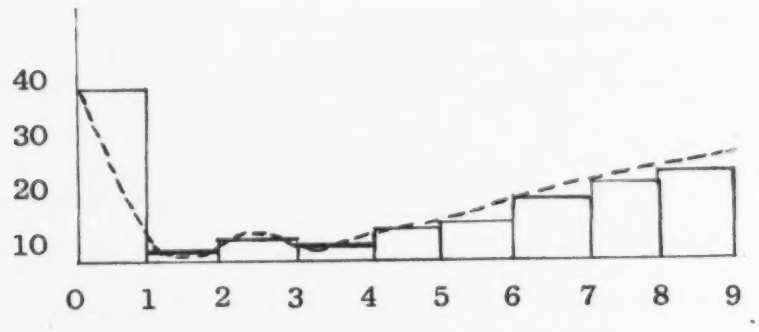
Use of different types of information	(Q.15)
Importance of different types of information	(Q.16)
Use of physical forms for research	(Q.17)
Use of physical forms for teaching	(Q.63)
Methods of locating references for research	(Q.20)
Sources of stimulus in research	(Q.54)

In addition, Q.64, sources of references for teaching, employed a set of rating-scales from 0 to 5. This has been left unaltered.

It was originally suggested that the rating-scales might be turned into rankings. Obviously, it is impossible to rank 20 or even 10 items very accurately, and employing rating-scales as a basis for producing rankings was intended to obviate difficulties with this part of the questionnaire. Unfortunately, it was evident when the data had been coded and punched, and test-runs had been made on a sample of the cases, that rankings would have given a false picture of the data, inasmuch as they would have shown an ordered series of preferences where none really existed. The responses to, for example, the question on use of forms shows that preferences for formats and channels of communication fall into three categories - the heavily used, the moderately used, and the unused. It would be meaningless, if not actually misleading, to rank use of videotape against use of film when the absolute number of users of these two media is so small. Conversely, nearly everyone who filled in the questionnaire used journals and books, and similar considerations apply here. Ranking scales were produced on a straight count for each question, but no attempt has been made to use them in tabulation, partly for the reasons stated above and partly because we were advised that, in any case, to produce the necessary conversions would be exceedingly difficult with the programming language that we were using - and might prove impossible.

Given that both methodological and practical considerations ruled out this initial plan, it was necessary to find another method of presenting these data. To have retained the original scales from 0 to 9 unaltered would have produced unwieldy tables full of many empty cells. The possibility of collapsing the scales was explored, and this technique was adopted.

As can be seen from the histograms below, test-runs on a sample of the cases indicated that the rating scales were seen by respondents as having a discontinuous part (0) and a continuous part (1-9). The number of histograms produced which are heavily skewed towards the zero end of the scale is an indication of this:



A smooth curve can often be imposed upon the histogram. Since that part of the scale from 1-9 had been treated as continuous, it was decided to divide it into three broader categories, keeping '0' separate. In the tables as finally presented, therefore, the conversions have been carried out thus:

New scale	Old scale	Key
0	0	not used/importance
1	1 - 3	rare use/importance
2	4 - 6	moderate use/importance
3	7 - 9	frequent use/importance